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Environmental assessment guidance to be used by consultants preparing facilities plans for municipal sewage treatment facilities when evaluating the environmental and socio economic impacts of project alternatives.

The purpose of this guide is to integrating environmental, social and economic evaluations into the facility planning process.

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230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

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ENVIRONMENTAL ASSESSMENT GUIDANCE MUNICIPAL SEWAGE TREATMENT WORKS PROGRAM

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UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

November 1, 1977

TO: APPLICANTS FOR SEWAGE TREATMENT FACILITY
GRANTS AND THEIR CONSULTANTS

This Environmental Assessment Guidance is a reprint of the Guidance dated February 1977 with only minor revisions. It is offered to assist you in preparing facility plans for construction of municipal sewage treatment works. It is meant as a guide to integrating environmental, social and economic evaluation into the facility planning process.

In using this guidance it should be realized that it is of a general nature. Since projects vary so greatly in size and scope, the detail and scope of evaluation will vary from case to case.

It should also be recognized that this guidance is a working document. Any suggested changes or comments related to it are welcomed so that the environmental assessment process can be continually refined and improved. Comments and suggestions can be returned to us on the franked fold-up card to be found on the following page. The card may also be used to request additional copies of the guidance.

Sincerely yours,

Charles H. Sutfin
Director, Water Division

NAME OF RESPONDENT: _____

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E.I.S. Preparation Section

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REGION V
GUIDELINES FOR
ENVIRONMENTAL ASSESSMENT PREPARATION

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REGION V
WATER DIVISION
ENVIRONMENTAL PROTECTION AGENCY
GUIDANCE FOR
ENVIRONMENTAL ASSESSMENT PREPARATION

I. Introduction

This guidance is offered as a framework for integrating environmental, social, and economic evaluation into the facilities planning process.

In accordance with the National Environmental Policy Act (NEPA), the EPA is responsible for preparing EIS's on facilities plans and resultant wastewater treatment projects that significantly affect the environment. It is clearly the intent of NEPA that "statements serve as the means of assessing the environmental impact of proposed agency actions rather than a justification for decisions already made". It is not, however, the intent of NEPA that alternatives be screened solely on the basis of environmental impact, but simply to insure that environmental amenities are considered along with technical considerations, costs, and public desires.

To insure that the intent of NEPA is met, environmental, social, and economic evaluation must be viewed as an integral part of the facilities planning process. As such it should be performed throughout the process rather than after selection of a plan. This evaluation is an integral part of the cost-effective analysis portion of facilities planning.

A cost-effective analysis can be defined as a systematic comparison of alternative ways of dealing with a wastewater treatment and disposal problem in order to identify the solution which will minimize total costs to society over time. These costs include monetary and environmental as well as other non-monetary costs.

Cost-effectiveness is the central thrust of the Federal Water Pollution Control Act Amendments of 1972 (PL92-500). It is an attempt to integrate all important considerations early in the decision-making process and to meet the detailed requirements of the law in an efficient manner.

The cost-effectiveness analysis should be prepared so as to:

1. Provide the rationale for selecting a particular course of action from among alternatives evaluated. It is essential that a logical decision making process be followed and the factors governing selection be spelled out in the analysis.

2. Provide a document for evaluation by the general public. In part, this means that unnecessary technical detail, technical jargon and acronyms should be avoided.

If properly prepared using cost-effective analysis (including environmental, social, and economic evaluation), the facilities plan should provide the data and information necessary for EPA to prepare an environmental impact statement if required.

In using the attached guidance it should be realized that this guidance is of a general nature. The depth of detail and scope of the evaluation presented in the facilities plan will vary greatly from case to case. It is unnecessary to address an item covered in this guidance if it is clearly irrelevant to the type of project under consideration. Large complex projects will probably require more than is contained in this guidance. In any case, where there is some question concerning the scope of the evaluation, please contact your State water pollution control agency or the Planning Branch of the United States Environmental Protection Agency.

In addition to the environmental considerations contained throughout the facility plan, the facility plan should contain a summary of environmental considerations. The summary should include references to other portions of the plan where these considerations are discussed in more detail.

The following are the major topics to be discussed in the summary:

a. Description of the existing environment without the project.

b. Description of the future environment without the project.

c. Evaluation of alternatives.

d. Environmental impacts of the proposed action, including steps to minimize adverse effects.

II. Description of Project Background

This information should be summarized within the facilities plan so that it can be easily extracted for use if an EIS is required.

A. Project History

1. Briefly describe the study area in relation to the land uses, water qualify and water quantity objectives in the region. Examples of objectives and goals are:

   a. preserving or developing recreation areas, preserving wetlands, floodplains, or attractive open spaces;

   b. preserving or enhancing high quality waters with recreational, fishery, aesthetic or water supply values;

   c. implememenging groundwater recharge plans for augmenting water supply and preventing salt water intrusion;

   d. alleviating groundwater pollution;

   e. reusing treated wastewater, such as recycling nutrients in treated wastewater; and

   f. facilitating implementation of good planning and land use objectives by allowing considerations other than wastewater disposal to be the major development constraints.

2. To minimize the narrative, a map of the general area in which the proposed action would be implemented should be provided. The map should include river systems, drainage basins, major surface and groundwaters, existing interceptors and collectors, pumping stations and force mains, treatment facilities, effluent disposal and sludge disposal sites. Summarize the description of capacities of these facilities. Outline existing nonstructural actions contributing to attainment of water quality objectives, such as environmental zoning, urban runoff controls, erosion and sedimentation ordinances, water and sewer rate land use controls, and active public participation in decision making.

B. Existing Problem and Proposed Solution

A summary of the major water quality and water quantity problems in the study area should include even those problems which the EPA action will not completely solve. Summarize or reference existing water quality standards or effluent limitations.

Briefly describe both structural and nonstructural actions to solve the water quality problems discussed above.

Briefly describe the origin of the grant application, its priority determination and state certification. Identify grantees and their

consultants for facilities planning. Identification should include the grant administration digital identification number as shown in Chapter 12, Part I, "Grants Administration Manual".

List the total anticipated cost, the amount eligible for a grant under Section 201(g)(1), Public Law 92-500, and the Federal and state dollar contributions each will pay if a proposed action is recommended and approved.

C. Issues Identified by EPA and Others

Briefly state the issues identified by EPA, Other Federal agencies, regional or local agencies, citizens groups and environmentalists related to any proposed structural or nonstructural solutions to the water quality problems discussed above.

III. Inventory of the Existing Environment

Inventorying the existing environmental conditions in the area of the proposed action is important for the decisionmaker and the public. The environmental setting is the starting point for goal and problem identification and is the basis for the analysis and comparison of alternatives. While the focus should be on the immediate area of the proposed actions, where appropriate, parts of the surrounding area should also be included to avoid the risk of overlooking any important interbasin or regional impacts.

Through charts, tables, maps, and narration the plan should describe and graphically locate the area's natural and man-made features, especially any unique or environmentally sensitive areas. The narrative should be concise. Only those characteristics of the social, economic, and environmental setting which are most important in relationship to the alternatives should be discussed in any detail, and those which are not as relevant should be summarized in the narrative or included in summary tables to indicate they were not overlooked.

A. Natural Environment

The facilities plan should present a description of the physical-chemical, and biological conditions in the project area. Terrestrial, aquatic, and atmospheric environments should be covered. Special emphasis should be placed on describing land-water interfaces such as wetlands, beaches, and stream banks. These areas are very sensitive to alterations by wastewater treatment projects.

1. Atmosphere

a. Climate

Describe the climatic conditions for the general area of the proposed actions including temperature, precipitation, humidity, wind direction, and velocity. List any specific adverse weather conditions and their frequency. Also describe any topographic features that influence the weather.

b. Air Quality

To the extent pertinent, discuss the major factors affecting air quality and the current and anticipated future air quality in the project area. Identify and reference any air implementation plan for the area.

c. Noise

If available, identify the ambient noise levels in the project area in decibels (scale A). This would be especially applicable whenever a proposed site is located in close proximity to a residential area.

d. Odor

Identifying any major odor producers in the project area. Generally indicate the degree of effect on existing communities.

2. Land

a. Physical and Chemical

1) Topography

Describe the topography of the area of the proposed actions delineating the major and minor drainage basins along with their characteristics -- area, slope, elevation, natural and artificial drainage nets, erosion, and deposition.

2) Geology

Describe geologic structures or formations that have a direct influence on either groundwater or surface water resources. Areas where adverse soil or subsoil conditions may be encountered during construction should be illustrated and briefly described.

3) Soils

Identify soil types in the project area and their permeability, erosion potential, expansion, compaction and other characteristics in the study area which could affect or be affected by the project alternatives. Attention should be given to identifying suitability for septic tank use, land disposal, or treatment of effluents, road and building construction, landfills, and sludge disposal.

b. Biota

1) Plants - Habitat

Identify the location and general types of vegetative communities existing in the project area. One method of identifying communities is by use of assigned numbers and verbal description of composition found in the manual, Forest Cover Types of North America, published by the Society of American Foresters. Another way is to describe vegetation in terms of the various habitat types and quality available for wildlife use in the study area and to relate this discussion to the total habitat available in the region. The intent is to inventory vegetation in such a way that impacts of the project alternatives can be determined.

2) Animals - Wildlife Uses of Habitat

Discuss general types of vertebrate species in the study area; their use of habitat for breeding, feeding and cover; and an interpretation of their ecological significance. When possible, list vertebrates present in the project area. The intent is to describe the animal population in the manner which will make it easiest to determine project impact on them. Species lists alone with no interpretation of ecological significance are not very useful in assessing project impact on them. It is especially important to note any species on a Federal or State rare and endangered species list and those with direct economic or sport value. Appendix A provides addresses of state contacts for endangered and threatened species. It also provides lists of (proposed or implemented) endangered and threatened animals and plants of the United States occurring within Region V and gives their common names and descriptions of their habitats.

3. Water

a. Physical and Chemical

1) General

Using maps and narrative, describe the location of surface water bodies and groundwater aquifers in the facilities planning area. Watershed areas and aquifer recharge areas should be prominently displayed.

2) Water Quality and Quantity

Problems. Identify existing and potential water quality and quantity problems in the study area, specifically the relevant point and nonpoint sources of pollution, such as industry, municipalities, combined sewers, septic tanks, storm water runoff, agriculture, silviculture, aquaculture, mines or mine drainage and salt water intrusion. Identify violations of water quality standards. Indicate which sources will be served in the study area.

Uses. Describe the type and extent of existing and future surface and groundwater uses. Identify points where water is withdrawn for drinking, agricultural or industrial uses; include volumes withdrawn and points of return for both surface and groundwaters. If reuse or reclamation of water is practical in the study area, this should be discussed. Regulatory and administrative procedures in force to reduce water consumption (thereby reducing waste volume) should be summarized.

Management. Discuss all areawide or basin water quality management plans in force in the study area, court ordered allotments or interstate agreements involving water quality/ quantity in the study area. Identify any permits or orders

on specific water resources issued by state or local water pollution control agencies for maintaining or improving water quality.

Flood Hazards.

Discuss designated flood risk areas in the study area; indicate the 25, 50 and 100-year flood levels for the area. Identify any ongoing or proposed Corps of Engineers or Soil Conservation Service projects in any study area floodplain.

b. Biota

1) Plants

Generally describe significant aquatic vegetation including rooted aquatics, floating vascular plants, concentrations of filamentous green or bluegreen algae, and any plants significantly affecting the water's taste or clarity in the facilities planning area. Give an interpretation of their ecological significance.

Include information from the latest appropriate water quality survey prepared by the State water quality control agency. Include any available information describing the abundance and diversity of aquatic autotrophs.

2) Wetlands and Water/land Interfaces

Identify beaches, estuaries, stream banks, lake shores, marshlands and other wetlands in the study area. Discuss any tidal effects, effects of dissipating wave energy, dune migration, salinity changes causing siltation, effects of erosion and inundation or other physical systems or actions at work in the study area. Map flood hazard areas by showing annual, 5, 50 and 100-year floodplains, based on information available from HUD regional offices.

3) Sensitive Natural Areas

Identify and show on a map or a map with overlays any of the following located in the planning area: surface waters, marshland and wetlands, floodplains or flood-retention areas, groundwater recharge areas, steeply sloping (over 25 per cent) lands, forests and woodlands, prime agricultural lands, habitats of rare and endangered species, estuaries, and sensitive geologic areas. (Appendix A provides State and Federal lists of rare and endangered species within Region V.) A narrative description of these should be included. Interactions between identified areas should receive attention in this section.

B. Man-Made Environment

This section should present a description of the major man-made elements in the project area. Population, economics, land use, agricultural, archeological, cultural, historical, and recreational resources, transportation,

resource energy uses, water programs, and other projects, programs and efforts should all be discussed in a level of detail appropriate to the facilities plan.

1. Land Uses

a. Existing Land Uses

Discuss existing land uses, such as residential, commerical and public services, industrial, cluster housing, strip development, extractive (mining, etc.), transportation, communications and utilities, institutional, open space and recreation, agricultural, water supply, archaeological, historic sites and other points of interest in the area of the proposed interceptors or treatment plant. Describe the extent and effectiveness of current land use planning by all levels use controls in effect.

b. Proposed Land Uses

For those categories listed above, discuss land uses proposed by local, state, national or regional governmental agencies in the areas of the proposed interceptors or treatment plants. Describe development trends for the industrial, agricultural, commercial, residential and recreational areas, especially those near or adjoining bodies of water; focus on any aspects of those trends which might threaten air or water quality or bring about other environmental problems, especially when interceptors or collectors are being proposed to service undeveloped land or run through undeveloped areas.

2. Demography and Economics

a. Existing Conditions

Discuss population characteristics from the last decennial census and any updated data available. Figures on employment and unemployment should be discussed with breakdowns by type of industry as used in census data. For added perspective, these data should be compared with state and national averages. Identify the major economic revenue producers of the study area. Discuss the most important of these, showing the basic money flow systems. Discuss any major economic problems which might affect growth in the study area.

b. Projected 5, 10 and 20-year Growth

Discuss projected trends related to total population and employment in the region and study area. The rates of growth for the region contained in reports for the Water Resources Council by the Bureau of Economic Analysis, Department of Commerce and the Economic Research Service, Department of Agriculture (the OBERS projections) should be used. The reasons for using a different forecasting system and the reasons for using a particular projection should be stated briefly.

If the projections used in the plan differ more than 10 percent from the OBERS projections, the reasons for using the figures should be stated. Discuss the relationship of local projections to relevant state and

national population and economic trends. Identify additional places of employment for the projected increases in study area population; discuss probable trends for the area's principal revenue producers and the local economy as a whole. Relate these trends to the future population projections discussed above and projected state and national economic conditions.

3. Cultural, Historical, Archeological Recreational Resources and Agricultural Resources

a. National Register Properties

Specifically identify properties located within the general project area that are included in, or eligible for, inclusion in the National Register of Historic Places. To identify included properties, consult the National Register and monthly supplements. To identify eligible properties, apply National Register criteria with the consultation of the State Historic Preservation Officer and local historical societies.

b. Archeological Sites

Due to the general unfamiliarity of most grant applicants with the procedures necessary to comply with applicable historic and archeological preservation legislation we have included a detailed discussion of this process in Appendix B.

c. Recreational Facilities

Describe the types, locations, and capacities of all park lands and other outdoor recreational facilities in the area. Indicate plans for future expansion of existing sites as well as new developments.

d. Agricultural Resources-Prime and Unique Farmland

In keeping with the Federal policy established by the National Environmental Policy Act, a consideration of the area's highly productive farmlands should be included in inventorying potentially impacted environmental elements. The categories of productive land identified by the Federal government are "prime" and "unique". "Prime" farmlands are those whose value derives from their general advantage as cropland due to soil and water conditions. "Unique" farmlands are those whose value derives from their particular advantage for growing specialty crops. The Soil Conservation Service is initiating a mapping program for the prime and unique farmlands of each state. Refer to Appendix E for information on the program for each state and the appropriate Soil Conservation Service contacts within each state for this program.

4. Resource Use

Identify present and projected amounts of electric power, natural gas, heating oil, and other power sources used in the area. Indicate future construction plans of relevant utility companies for the area. Identify any major natural resource users in the project area. Describe the type,

quantity and quality of energy resources produced or extracted in the project area.

C. Other Projects, Programs and Efforts

Describe any additional Federal, State, regional, or local projects and programs existing or planned which have or will have an impact (social, economic, or environmental) on the area. Relate any interaction between these projects and the attainment of project objectives. Include a description of relevant State and local laws such as water and air pollution control laws, wildlife conservation laws, noise and odor control ordinances, subdivision regulations, erosion control and urban runoff ordinances, and floodplain development control ordinances.

D. Documentation

Sources of information used to describe the existing environment and to assess future environmental impacts should be documented. These sources should include local, regional, State and Federal Agencies with responsibility or interest in impacts to aspects of the natural and man-made environment discussed above. In particular, the following agencies must be consulted.

1. Local and regional land use planning agencies for assessments of land use trends and population projections, especially those affecting size, timing, and location of facilities, and the planning activities funded under Section 701 of the Housing and Community Development Act of 1974 (Public Law 93-383).

2. The State coastal zone management agency and the appropriate office of the Department of Commerce, if coastal zones or coastal waters as defined in Title III of the Coastal Zone Management Act of 1972 (Public Law 92-583) may be affected.

3. The HUD Regional Office if the action may involve a flood-risk area identified under the Flood Disaster Protection Act of 1973 (Public Law 93-234).

4. Appropriate State officials and the Secretary of the Interior where national forest lands may be involved, and with the Secretary of Agriculture if the action may affect portions of rivers designated wild and scenic or being considered for this designation under the Wild and Scenic Rivers Act (Public Law 90-542).

5. The Secretary of the Interior or Secretary of Commerce if any threatened or endangered species defined under Section 4 of the Endangered Species Act of 1973 (Public Law 93-205) are identified in the project area.

6. The U.S. Fish and Wildlife Service (Department of Interior), the National Oceanic and Atmospheric Administration (Department of Commerce), the U.S. Army Corps of Engineers, and the head of the agency administering the wildlife resources of the particular state in which the action will take place if a wetland may be affected.

7. The State Historic Preservation Officer to meet the requirements of Section 106 of the National Historic Preservation Act of 1966, Executive Order 11594, and the Archeological and Historic Preservation Act of 1974.

8. The State offices of the United States Department of Agriculture Soil Conservation Service for information related to "prime" and "unique" farmland (See Appendix E).

IV. Development of Alternatives

A. General

1. Alternative waste management techniques will be evaluated based on the Best Practicable Waste Treatment Technology (BPWTT) or, as applicable, more stringent criteria required to meet water quality standards.

2. Both the development and comparison of alternatives should be presented in a clear and concise manner so the public can follow the logic of the decision-making process.

3. One alternative which should always be included is that of "no action" -- allowing the existing wastewater treatment works or septic tanks to continue in use -- so that the public will understand the environmental implication of allowing the existing situation to continue.

B. Steps in Development of Alternatives

The development of feasible alternative systems requires four major steps. First, major subsystems and possible subsystems alternatives should be identified. Secondly, the objectives of the project must be examined and subsequent alternatives incapable of meeting these objectives eliminated. Thirdly, identified constraints to these alternatives are applied to reduce the number of subsystems considered. And finally, the remaining subsystems' interactions are evaluated to further limit feasible alternatives.

Each subsystem has several alternatives as input to the final solution of the water quality problem and to progress toward other specific objectives and goals. The facilities plan should include a narrative discussion of these alternatives as well as a summary table or display of the major points in the narrative. Tables 1 and 2 are examples of alternatives summaries. Constraints may well limit or require the rejection of one or more of the available alternatives. A brief discussion should establish the reason for rejection. Appendix C entitled "Locally Sensitized Alternative Analysis" is offered as an example of a type of evaluation procedure which may be used in analyzing alternatives.

C. Considerations in Developing Alternatives

1. Analysis of Joint Treatment or Regionalization Questions

(Regional questions may have already been resolved by existing approved plans. If this is the case, summarization of important conclusions and proper referencing of these regional plans may suffice).

a. Identification and assessment of feasible treatment works and interceptor combinations within the planning area. (It should be noted that certain simplifying assumptions must be made for

purposes of this analysis, e.g., treatment proc sses. These simplifying assumptions must be clearly spelled out).

1) Monetary costs of the feasible combinations should be assessed in terms of the "total present worth" of the entire system.

2) Significant environmental effects resulting from the implementation of each of the feasible combinations should be presented. Particular attention should be paid to differences in impact between the proposed combinations. Unique regional problems to be addressed are:

   a) Effects of interceptor locations on land use within and between urban areas.

   b) Effects of alternative combinations on stream flows in the region.

3) Other non-monetary costs should be evaluated, including:

   a) Possible site limitations -- is area available for future expansion or additions?

   b) Possible differences in operation and maintenance capability and reliability.

b. Based on information contained in 1, a recommendation for a specific treatment configuration should be made. This recommendation should include:

1) A map of the regional area with specific service areas for each proposed treatment plant delineated, and

2) A specific statement which identifies the political units lying within the service area of each proposed plant.

2. Consideration of Non-Structural Alternatives

There are both structural and non-structural alternatives for the solution of water quality problems. Structural alternatives are related to the construction of new, or the upgrading of existing, wastewater treatment works. Non-structural alternatives include:

- Improved operation and maintenance techniques
- Flow and waste reduction measures, such as industrial reuse and recycling
- Land use and development controls and management practices
- Non-point sources controls, e.g., urban or agricultural runoff ordinances: erosion and sedimentation ordinances

- Institutional arrangements, e.g., combination of facilities, wastewater discharges, etc.

- Negative or no growth policy

- Educational programs for decreased water use and wastewater generation

- Water and sewer rate structure alterations.

Past approaches have been weighed heavily toward structural solutions to problems. In the future equal consideration should be given to the non-structural approach -- by investigating what optimum mix might bring the best alternative solution.

The previously identified non-structural alternatives should be evaluated along with structural. This discussion should include evaluation of those measures already taken, proposed to be taken, and constraints on the system which eliminates other non-structural measures. If non-structural alternatives are part of the strategy, the degree to which the effectiveness of structural alternatives is increased should be noted. If none are used, the possible benefits that could be realized should be noted.

3. Analysis of Alternative Treatment Systems (including structural and non-structural measures) within a Specific Service Area

a. The effect which "no action" would have on communities involved must be addressed. It is not sufficient just to indicate that the communities involved are under orders. The analysis must examine potential effects on:

1) Surface water quality.

2) Land use - examine restrictions on land use which might be imposed by "no action".

3) Groundwater quality - examination of limitations in utilizing private septic systems.

4) Socio-economic character of communities.

a) Health hazards

b) Industrial development;

b. Preliminary alternative systems featuring at least one technique under each of the three categories below (treatment and discharge, wastewater reuse, and land application) will be developed and screened. A detailed proposal will be prepared for each unless adequate justification for eliminating a technique during the preliminary screening process is presented.

1) Treatment and discharge to surface waters

   a) Biological treatment

   b) Physical-chemical treatment

   c) Systems combining the above techniques

2) Treatment and wastewater reuse

   a) Industrial processes

   b) Groundwater recharge for water supply enhancement

   c) Surface water supply enhancement

   d) Recreation lakes

   e) Land reclamation

3) Land application -- the application of wastewater effluents on the land involves the recycling of most of the organic matter and nutrients by biological action in the soil plus plant growth for the breakdown and disposal of nutrients. Land application techniques include:

   a) Irrigation including spray, ridge and furrow, and flooding

   b) Overland flow

   c) Infiltration percolation

4. Project Objectives Screening

Following identification of potential system alternatives an initial screening should be made to eliminate those alternatives which are incapable of meeting project objectives. Examples of this might be:

a. Certain treatment processes do not meet water quality objectives;

b. Interceptor systems failing to service major pollutant generators;

c. Outfall locations requiring treatment levels beyond that available.

5. Analysis of Constraints

Limiting factors, assumptions, or conditions that affect the scope of alternatives considered or analyses performed should be applied to the alternatives already developed to further reduce the number con-

sidered. These constraints may be sufficient reason to reject a large number of alternatives outright, eliminate a portion of the analysis without further consideration, or they may reflect on the effectiveness or scope of available alternatives. Examples of such constraints include:

a. The proposed treatment works is intended to demonstrate a particular technology (example: nitrogen removal);

b. Capital, maintenance and operation cost may preclude some alternatives (example: the level of bonded indebtedness for a community may limit the funds available; the tax base may not allow enough extra cash for O&M);

c. Statutory and administrative controls on residential and commercial development in the area may preclude any effective system alternative (example: zoning variances which allow development of formerly designated open areas, or withdrawal of zoning classification to allow a more dense population configuration);

d. The work is limited in scope and only a partial analysis is necessary (example: modification of an existing facility);

e. The alternative may encourage undesirable growth in certain heretofore unserviced areas.

6. Subsystem Interaction

Interactions between various alternative subsystems may further restrict the number of viable system alternatives. Possible combinations of subsystems must be evaluated to determine which systems are capable of meeting project objectives realizing previously identified constraints.

As an example, an objective of prevention of groundwater depletion might be adopted which limits treated effluent disposal to the reclamation of wastewater effluent for groundwater recharge. This in turn will affect the degree of wastewater treatment that must be used and represents a subsystem interaction. Since the degree of treatment may well necessitate an advanced waste treatment process, large volumes of sludge may result. This in turn limits the sludge disposal method available and represents another subsystem interaction. The community may have difficulty meeting the O&M costs, which may place limits on the number of advanced waste treatment processes that can be used.

In many instances, the interaction of subsystems will be such as to place constraints on the selection process. Another example might be that the optimum network of interceptors depends largely on the gravity drainage pattern of the service area. Once the position of this network is established, certain constraints (physical and economic) are placed on the location alternatives for the treatment subsystem. This location decision at the subsystem level may also substantially affect both effluent and sludge disposal alternatives. For example, a river outfall might well determine the degree of treatment prior to the discharge of the effluent. This, in effect,

limits the total available choices in the selection of subsystems. The same interactions occur with regard to degree of treatment and disposal alternatives.

D. Detailed Evaluation of those Alternatives Remaining after the Preliminary Screening

These remaining alternatives should then be evaluated on the basis of:

1. Calculation of "total present worth" for each alternative and subsystem component including the possibility of phased additions, where appropriate (For cases where there is a projected development of more than 2% the possibility of phased additions should definitely be a consideration.);

2. Contributions to water quality goals and objectives;

3. Significant environmental effects, both positive and negative, of each alternative including a discussion of future development impacts (A more detailed presentation of impact analysis follows in the next chapter.);

4. Operability, reliability and flexibility of each alternative and any subsystem included in each alternative.

V. Evaluation of Environmental Impact

A. General

The beneficial and detrimental environmental effects of the project alternatives should be evaluated in planning the project and should be discussed in detail in the facilities plan. The natural and man-made factors inventoried in initial planning of the project may be affected by implementing the alternatives. Therefore, the analysis of project impacts should be organized to systematically consider the impacts on those existing environmental factors previously inventoried. By using the same categories inventoried a direct comparison can be made of the situation with and without the proposed project.

In narrative form the facilities plan should describe the environmental impact of the strucutral and non-structural actions considered as alternatives. In many cases the impact may be associated with a single subsystem or non-structural action. If more than one subsystem or action impacts a category, the cumulative impact should be described. The assessment of impacts should be divided into two parts. The first part should consider primary effects which are directly related to the construction and operation of a facility. The second part should consider project-induced impacts (secondary impacts) within the project area. The primary and secondary impacts discussed should be categorized as:

1. beneficial or adverse
2. short or long-term
3. reversible or irreversible.

B. Categories of Effects

1. Primary Effects

Examples of primary adverse, long-term, irreversible impacts from construction and operation of a wastewater treatment works which should be evaluated include:

a. destruction of historical, archeological, geological, cultural, or recreational areas;

b. contamination of a groundwater aquifer from failure;

c. destruction of sensitive ecosystems (e.g., wetlands);

d. consumption of materials in construction and operation (e.g. chemicals used in the treatment process);

e. eutrophication of a body of water;

f. jeopardizing an endangered species;

g. displacement of population; and

h. operational accidents (e.g., chemical spills).

2. Secondary Effects

Examples of secondary adverse, long term, irreversible impacts induced by a project which should be evaluated include:

a. Changes in the rate, density, or type of development, including residential, commercial, industrial, or changes in the use of open space, floodplains, prime agricultural land or other environmentally sensitive categories of land;

b. Violations of air or water quality standards stemming from secondary development; and

c. Damage to sensitive ecosystems (e.g., wetlands) or jeopardy to endangered species, resulting from the secondary growth.

Appendix D is offered as assistance in analyzing project-induced secondary impacts.

3. Unavoidable Adverse Impacts

List those adverse impacts identified under the discussion of primary and secondary effects of alternatives or provide a summary table of these impacts. This allows the independent reviewer to quickly compare the alternatives on the basis of their most serious environmental effects.

4. Relationship between Local Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity

The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity is often one of trade-offs or a balancing of impacts over time. Sacrificing short-term uses of a resource may result in long-term benefits. However, opting for immediate gain may mean foregoing opportunities for gain at some future time.

While there is no fixed timetable to distinguish the short-term from the long-term, generally a local short-term use of the environment is defined as a direct consequence of the project in its immediate vicinity. Long-term effects are those which are the result, either directly or indirectly, of the project and in most cases are considered to be permanent effects.

The local short-term uses of land in the study area are for the proposed project, constructed as part of a wastewater treatment system, and the commercial and residential development of open land

induced by the project. Long-term productivity of the available habitat and open land in the study area as a wildlife resource and as a land resource for future agricultural or urban use will be affected by short-term land use decisions.

A short-term decision has immediate and long-term effects. Immediate temporary effects during construction of the project would be localized disruption of traffic, increased noise levels and potential erosion of bare soils. However, these impacts might be inconsequential compared with long-term benefits for the water quality and quantity in the study area. Long-term effects would include changing the water quality of surface and groundwater resources in the study area and developing new land uses in the study area. Another long-term effect would be an overall decrease in the amount of open land in the county or region for agriculture, recreation or commercial and residential uses.

5. Irreversible and Irretrievable Commitments of Resources

Summarize the commitment of land, person-hours for design and construction, energy, raw materials and funds required to implement each alternative. These commitments should be quantified whenever possible.

6. Steps to Minimize Harm or Enhance the Environment

List any mitigative steps identified under the discussion of primary and secondary effects of alternatives or provide a summary table of these measures. An example of mitigative measures which could be taken is the case where an interceptor or collection system routing is changed to avoid impacting on a sensitive natural area such as a wetland. Appropriate measures to lessen adverse impacts will vary with each project. Common sense, augmented by ingenuity, can be used to select appropriate methods of control.

7. Summary Table

In addition to the narrative, the environmental impacts occurring in each environmental category should be displayed in a summary table.

IV. Federal/State Agency and Public Participation

The participation of local, State, and Federal agencies, individual citizens and interested environmental groups, in the preparation of facilities plans is of the utmost importance. Their suggestions, criticisms and objections should be given full consideration.

Any agency or public participation in the review of alternatives through public hearings should be identified and briefly discussed. If public hearings have not been held during preparation of the facilities plan, this fact should also be noted.

The plan should contain a complete history of any public meetings or hearings related to the proposed action. The history should state the official title, time, date and place of the hearing and the specific reason why it was held. A summary of the hearing should be appended to the plan.

APPENDIX A

INFORMATION RELATED TO ENDANGERED AND THREATENED SPECIES OF WILDLIFE AND PLANTS

LIST OF ENDANGERED AND THREATENED
WILDLIFE SPECIES OF THE UNITED STATES,
AND THOSE ON REVIEW STATUS, OCCURRING
WITHIN REGION V - TAKEN FROM THE UNITED
STATES DEPARTMENT OF THE INTERIOR
"THREATENED WILDLIFE OF THE UNITED STATES,"
1973 EDITION AND AMENDMENTS

ENDANGERED AND THREATENED WILDLIFE SPECIES OF THE UNITED STATES OCCURRING WITHIN REGION V.

1. Common Name: Longjaw Cisco
   Scientific Name: Coregonus alpenae

   States Where Found Within Region V: MI, OH, IN, WI

   Present Distribution: Greatly reduced numbers throughout Lakes Michigan and Huron, and a very small population in the small deep hole in eastern Lake Erie that was still present as late as 1948.

2. Common Name: Blue Pike
   Scientific Name: Stizostedion vitreum glaucum

   States Where Found Within Region V: MI, OH, IN, WI

   Present Distribution: Very uncommon in the deeper and cooler areas of Lake Erie and possibly Lake Ontario.

3. Common Name: Arctic Peregrine Falcon
   Scientific Name: Falco peregrinus tudrius

   States Where Found Within Region V: Regional

   Present Distribution: Breeds in the treeless tundra area of Arctic Alaska, Canada, and Western Greenland. Migrates south chiefly through eastern and middle North America to gulf coast of United States, middle and South America as far south as Argentina and Chile. Band recoveries indicate that southward migration along the Atlantic coast may be chiefly from breeding areas in western Greenland.

4. Common Name: American Peregrine Falcon
   Scientific Name: Falco peregrinus anatum

   States Where Found Within Region V: Regional

   Present Distribution: Primarily western North America, but breeding range could include part of eastern United States.

5. Common Name: Whooping Crane
   Scientific Name: Grus americana

   States Where Found Within Region V: Regional

   Present Distribution: Breeds in Wood Buffalo National Park, central southern Mackenzie, Canada. Winters on Gulf Coast of Texas, occasionally into Mexico.

6. Common Name: Kirtland's Warbler
   Scientific Name: Dendroica kirtlandii

   States Where Found Within Region V: MI

   Present Distribution: Breeds in the northern part of the lower peninsula of Michigan from Lake Huron west to Kalkaska County and from Presque Isle County south to Ogemaw County principally in watershed of the AuSable River. Nesting habitat young jack pines with low brushy undergrowth. Winters in the Bahama Islands. Recent records from Eleuthera, New Providence, and Grand Bahama, 5 in 1964. Winter habitat noted as pine woods, broad-leafed scrub, and Australian pine (Casuarina).

7. Common Name: Indiana Bat
   Scientific Name: Myotis soladis

   States Where Found Within Region V: Regional

   Present Distribution: Midwest and Eastern United States from the western edge of Ozark region in Oklahoma to central Vermont, to southern Wisconsin, and as far south as northern Florida. Distribution is associated with major cavernous limestone areas and areas just north of cave regions.

8. Common Name: Gray Bat
   Scientific Name: Myotis grisescens

   States Where Found Within Region V: Regional

   Present Distribution: Certain kinds of caves in southern and central United States. Distribution associated with major cavernous limestone areas.

9. Common Name: Eastern Cougar
   Scientific Name: Felis concolor cougar

   States Where Found Within Region V: Regional

   Present Distribution: On the basis of reports of sightings, Wright (1971) says:
   "...the range of the supposedly extinct eastern panther runs across the Laurentians from central Ontario to the Atlantic coast of Cape Breton Island, and between the Mississippi and the Atlantic south to where it merges with the range of F. c. coryi."

10. Common Name: Eastern Timber Wolf
    Scientific Name: Canis lupus lycaon

    States Where Found Within Region V: MN, WI, MI

    Present Distribution: The Lake Superior region of Michigan and the International border region of Minnesota; Isle Royale, Michigan; Ontario, Canada, north to James Bay, eastward to Gulf of St. Lawrence.

11. Common Name: Scioto Madtom
Scientific Name: Naturus trautman

States Where Found Within Region V: OH

Present Distribution: In a riffle area in the lower portion of Big Darbey Creek, tributary to the Scioto River, Pickaway County, Ohio.

12. Common Name: Sampson's Pearly Mussel
Scientific Name: Epioblasma Sampsoni

States Where Found Within Region V: IL, IN

Present Distribution: Wabash River in Illinois and Indiana.

13. Common Name: White Cat's Paw Pearly Mussel
Scientific Name: Epioblasma sulcata delicata

States Where Found in Region V: IN, MI, OH

Present Distribution: Detroit River, Michigan, Indiana, St. Joseph River, Michigan, Ohio.

14. Common Name: Tubercled-blossom Pearly Mussel
Scientific Name: Epioblasma torulosa torulosa

States Where Found Within Region V: IL

Present Distribution: Lower Ohio River in Kentucky and Illinois, Notichucky River in Tennessee, and Kanawha River in West Virginia.

15. Common Name: Higgins' Eye Pearly Mussel
Scientific Name: Lampellis Higginsi

States Where Found in Region V: IL, MN, WI

Present Distribution: Mississippi River in Minnesota, Wisconsin, and Illinois; Meramec River in Missouri; St. Croix River in Wisconsin and Minnesota.

16. Common Name: Pink Mucket Pearly Mussel
Scientific Name: Lampsilis orbiculata orbiculata

States Where Found in Region V: OH

Present Distribution: Green River, Kentucky; Kanawha River in West Virginia; Tennessee River (Tenn. and Ala.); Muskingum River, Ohio

17. Common Name: Southern Bald Eagle
Scientific Name: Haliacetus leucocephalus

States Where Found in Region V: Regional

Present Distribution: South of 40^{o} Latitude

WILDLIFE SPECIES ON REVIEW STATUS TO DETERMINE WHETHER THEY ARE ENDANGERED OR THREATENED

Common Name	Scientific Name	Known Distribution
Freshwater Sponges:		
Muscular sponge	Anheteromeyenia biceps	Michigan
Butterflies:		
Mitchell's satyr	Euptychia mitchellii	Indiana, Michigan
Dakota skipper	Ilesperia dakotae	Minnesota
Freshwater Fishes:		
Crystal darter	Ammocryptera asprella	Indiana, Illinois, Ohio, Wisconsin
Eastern sand darter	Ammocryptera pellucida	Illinois, Indiana, Michigan, Ohio
Longhead darter	Percina macrocephala	Ohio
Freshwater Crustaceans:		
Scud	Apocrangonyx lucifugus	Illinois
Subtle cave scud	Apocrangonyx subtilis	Illinois
Scud	Crangonyx anomalus	Indiana, Ohio
Mineis cave scud	Crangonyx minor	Indiana, Illinois
Packard's cave scud	Crangonyx packardi	Indiana
Scud	Gammarus acherondites	Illinois
Scud	Stygobromus putcalis	Wisconsin
Birds:		
Eastern Marten	Martex americana americana	Maine, Michigan, Minnesota New Hampshire, New York Vermont, Wisconsin

PROPOSED ENDANGERED AND
THREATENED PLANT SPECIES
OF THE UNITED STATES

PROPOSED ENDANGERED AND THREATENED PLANT SPECIES OF THE UNITED STATES - ILLINOIS

Scientific Name	Proposed Status	Common Name or Family*	Habitat*
Aster chasei	T	Aster family	Prairies
Lespedeza leptostachya	E	Bush clover	Rocky hills, glades, and river banks
Petalostemum foliosum	E	Prairie clover	Island in Kankakee River, Ill., open woods, gravels, shores
Iliamna remota	E	Mallow family	Dry woodland
Isotria medeoloides	E	Small-whorled pogonia	Sandy dunes
Rhus trilobata var. arenaria	T	Fragrant sumac, lemon sumac, polecat bush	Dry prairies
Asclepias Meadii	E	Milkweed, silk weed	Gravelly shores and sandy thickets
Boltonia asteroides var. decurrens	T	Aster family	Woods and thickets
Cyperus grayoides	E	Umbrella sedge	Calcareous barrens and cedar glades
Apios Priceana	E	Wild bean	Wooded ravines[1]
Astragalus tennesseensis	T	Ground Plum	Wet ground[1]
Synandra hispidula	T	Lamiaceae	Wet meadows[1]
Platanthera flava	T	Tubercled orchis[1]	Moist woods[1]
Platanthera leucophaea	T	White-fringed orchis[1]	
Platanthera peramoena	T	Fringeless purple orchis[1]	

PROPOSED ENDANGERED AND THREATENED PLANT SPECIES - OF THE UNITED STATES - ILLINOIS (cont.)

Scientific Name	Proposed Status	Common Name or Family	Habitat*
Muhlenbergia curtisetosa	T	Poaceae	Woodlands, thickets, dooryards, roadsides
Poa paludigena	T	Speargrass	Sphagnum bogs, tamarack-swamps, cold springheads
Asplenium kentuckiense	T	Polypodiaceae	
Dodecatheon frenchii	T	Shooting star	Rich woods and rocky ledges
Cypripedium candidum	T	Small white ladyslipper	Calcareous meadows, prairies, mossy glades
Thismia americana	T	Burmaniaceae	
Plantago cordata	T	Plaintain, heartleaf	

PROPOSED ENDANGERED AND THREATENED PLANT SPECIES OF THE UNITED STATES - INDIANA

Scientific Name	Proposed Status	Common Name or Family*	Habitat*
Iliamna remota	E	Mallow family	Open woods, gravel shores
Rhus trilobata var. arenaria	T	Fragrant sumac, lemon sumac, polecat bush	Sandy dunes
Asclepias Meadii	E	Milkweed, silkweed	Dry prairies, calcareous bluffs
Lesquerella globosa	T	Brassicaceae	Calcareous bluffs
Platanthera flava	T	Tubercled orchis[1]	Wet ground[1]
Platanthera leucophaea	T	White-fringed orchis[1]	Wet meadows[1]
Platanthera peramoena	T	Fringeless purple orchis[1]	Moist woods[1]
Poa paludigena	T	Speargrass	Sphagnum bogs, tamarack-swamps, cold springheads
Phlox bifida var. stellaria	T	Polemoniaceae	Dry cliffs, bluffs, sandhills, dunes
Sullivantia Sullivantii	T	Saxifragaceae	Wet limestone and sandstone cliffs
Cypripedium candidum	T	Small white ladyslipper	Calcareous meadows, prairies, mossy glades

PROPOSED ENDANGERED AND THREATENED PLANT SPECIES OF THE UNITED STATES - MICHIGAN

Scientific Name	Proposed Status	Common Name or Family*	Habitat
Primula mistassinica	T	Bird's-eye primrose	Calcareous rocks, shores and meadows
Cypripedium candidum	T	Small white ladyslipper	Calcareous meadows, prairies, mossy glades
Platanthera flava	T	Tubercled orchis[1]	Wet ground[1]
Platanthera leucophaea	T	White-fringed orchis[1]	Wet meadows[1]
Isotria medeoloides	E	Small whorled pogonia	Dry woodland
Phyllitis scolopendrium var. Americana	E	Hart's-tongue fern	Crevices and cool slopes or sinkholes of dolomite and other calcareous rock
Woodsia abbeae	T	Polypodiaceae	Crevices of high cliffs[2]
Trollius laxus	T	Spreading globefoot	Rich meadows and swamps
Mimulus glabratus var. Michiganensas	T	Scrophulariaceae	Wet shores and springy places
Iris lacustris	T	Iris family	Beaches, sandy woods and bogs near the Great Lakes
Cypripedium arietinum	T	Ram's head ladyslipper	Damp or mossy woods or bogs
Listera auriculata	T	Auricled twayblade	Alluvial banks, calcareous silts or crevices, alder thickets, and arbor-vitae swamps

PROPOSED ENDANGERED AND THREATENED PLANT SPECIES OF THE UNITED STATES - MICHIGAN cont.

Scientific Name	Proposed Status	Common Name or Family*	Habitat*
Poa paludigena	T	Speargrass	Sphagnum bogs and tamarack swamps
Potamogeton hillii	T	Pondweed	Ponds, slow streams, borders of lakes

PROPOSED ENDANGERED AND THREATENED PLANT SPECIES OF THE UNITED STATES - MINNESOTA

Scientific Name	Proposed Status	Common Name or Family*	Habitat*
Lespedeza Leptostachya	E	Bush clover	Prairies
Polemonium occidentale var. lacustre	T	Greek valerian, jacob's ladder	Arbor-vitae swamps, St. Louis County, Minnesota
Woodsia abbeae	T	Woodsia[2]	Crevices of high cliffs[2]
Erigeron pulchellus var. Tolsteadii	T	Robin's plantain	Copses, open woods and meadows
Erythronium propullans	T	Dog's tooth violet	Rich woods of flat bottomlands
Cypripedium arietium	T	Ram's head ladyslipper	Damp or mossy woods or bogs
Listera auriculata	T	Auricled twayblade	Alluvial banks, calcareous silts or crevices, alder thickets, arbor-vitae swamps
Platantherea flava	T	Tubercled-orchis[1]	Wet ground[1]
Platanthera leucophaea	T	White-fringed orchis[1]	Wet meadows[1]
Gymnocarpium heterosporum	T	Polypodiacede	
Cypripedium candidum	T	Small white ladyslipper	Calcareous meadows, prairies, mossy glades

PROPOSED ENDANGERED AND THREATENED PLANT SPECIES OF THE UNITED STATES - OHIO

Scientific Name	Proposed Status	Common Name or Family*	Habitat*
Solidago shortii	T	Goldenrod	Rocky slopes
Calamagrostis insperata	T	Poaceae	
Trollius laxus	T	Spreading globeflower	Rich meadows and swamps
Rhus trilobata var. arenaria	T	Fragrant sumac, lemon sumac polecat bush	Sandy dunes
Oxypolis canbyi	T	Hog-fennel	Bogs
Apios Priceana	T	Wild bean	Woods and thickets
Platanthera flava	T	Tubercled-orchis[1]	Wet ground[1]
Platanthera leucophaea	T	White-fringed orchis[1]	Wet meadows[1]
Platanthera peramoena	T	Fringeless purple orchis[1]	Moist woods[1]
Muhlenbergia curtisetosa	T	Poaceae	Woodlands, thickets, dooryards, roadsides
Poa paludigena	T	Speargrass	Spaghum bogs and tamarack swamps
Polemonium reptans var. villosum	T	Greek valerian, jacob's ladder	Rich woods and and bottoms

PROPOSED ENDANGERED AND THREATENED PLANT SPECIES OF THE UNITED STATES - WISCONSIN

Scientific Name	Proposed Status	Common Name or Family*	Habitat*
Gnaphalium obtusifolium var. saxicola	E	Catfoot	Siliceous ledges and cliffs
Lespedeza leptostachya	E	Bush-clover	Prairies
Woodsia abbeae	T	Woodsia[2]	Crevices of high cliffs[2]
Oxytropis campestris var. chartacea	T	Fabaceae	
Iris lacustris	T	Iris Family	Beaches, sandy woods and bogs near the Great Lakes
Cypripedium arietinum	T	Ram's head ladyslipper	Damp or mossy woods or bogs
Listera auriculata	T	Auricled twayblade	Alluvial banks, calcareous silts or crevices, alder thickets and arbor-vitae swamps
Platanthera flava	T	Tubercled-orchis[1]	Wet ground[1]
Platanthera leucophaea	T	White-fringed orchis[1]	Wet meadows[1]
Poa paludigena	T	Speargrass	Sphagnum bogs and tamarack swamps
Gymnocarpium heterosporum	T	Polypodiaceae	

PROPOSED ENDANGERED AND THREATENED PLANT SPECIES OF THE UNITED STATES - WISCONSIN cont.

Scientific Name	Proposed Status	Common Name or Family*	Habitat*
Aconitum noveboracense var. quasiciliatum	E	Monkshood, northernwild	Rich woods, shaded ravines, and damp slopes
Cypripedium candidum		Small white ladyslipper	Calcareous meadows, prairies, mossy glades

*Common names and habitat taken from Grays Manual of Botany, Fernald, M. L., eighth edition, copyright 1950 unless otherwise noted.

[1]Flora of Illinois, Jones, G. N., American Midland Naturalist Monograph Series, second edition, copyright 1950.

[2]A Flora of Northeastern Minnesota, Lakela, Olga, University of Minnesota Press, Minneapolis, Minnesota, copyright 1965.

T = Threatened

E = Endangered

RARE AND ENDANGERED SPECIES CONTACTS WITHIN REGION V

FOR STATES AND THE U.S. FISH AND WILDLIFE SERVICE

RARE AND ENDANGERED S PECIES CONTACTS

State of Illinois
Director
Illinois Department of Transportation
605 State Office Building
400 South Spring Street
Springfield, Illinois 62706

State of Indiana
Director
Indiana Department of Natural Resources
Division of Fish and Wildlife
608 State Office Building
Indianapolis, Indiana 46204

State of Michigan
Howard A. Tanner, Director
Department of Natural Resources
Stevens T. Mason Building
Lansing, Michigan 48926

State of Minnesota
Director
Minnesota Department of Natural Resources
Division of Fish and Wildlife
301 Centennial Office Building
658 Cedar St.
St. Paul, Minnesota 5515

State of Ohio
Chief
Ohio Department of Natural Resources
Division of Wildlife
Fountain Square
Columbus, Ohio 43224

State of Wisconsin
Director
State of Wisconsin
Department of Natural Resources
P.O. Box 450
Madison, Wisconsin 53701

U.S. Fish and Wildlife Service
Federal Building, Fort Snelling
Twin Cities,Minnesota 55111
ATTN: Mr. C.E. Faulkner
Telephone 612/725-3500

APPENDIX B
GUIDANCE FOR HISTORICAL AND ARCHEOLOGICAL PRESERVATION

GUIDANCE FOR
ARCHAEOLOGICAL AND HISTORIC PRESERVATION
REGION V WATER DIVISION
ENVIRONMENTAL PROTECTION AGENCY
Revised October 1977

I. Relevant Laws

The following Federal statutes and regulations relate to the protection of historic and archaeological sites and properties. These laws, and the procedures required to implement them, must be taken into consideration in the facilities planning /construction grants process.

A. Antiquities Act of 1906 (16 USC Sec. 431).
B. Historic Sites Act of 1935 (16 USC Sec. 461).
C. National Historic Preservation Act of 1966, as amended, 1976 (16 USC Sec. 470).
D. Archeological and Historic Preservation Act of 1974 (16 USC Sec. 69).
E. National Environmental Policy Act of 1969 (42 USC Sec. 4321).
F. Executive Order 11593, "Protection and Enhancement of the Cultural Environment," May 13, 1971 (36 F.R. 8921).
G. "Procedures for the Protection of Historic and Cultural Properties," January 25, 1974, (36 C.F.R. Part 800).
H. Guidelines for the Preparation of Environmental Impact Statements, Council on Environmental Quality, August 1, 1973 (40 CFR Part 1500).
I. Preparation of Environmental Impact Statements - Final Regulations, USEPA, April 14, 1975 (40 CFR Part 6).

II. Policy

In the primary impact areas of a grant project EPA has the responsibility to assure that grantees/applicants undertake appropriate identification activities to determine the presence of cultural properties (including architectural, historic and archaeological properties) eligible for inclusion in the National Register. These activities may include field surveys where necessary. Final decisions on the necessity for survey work rests with EPA after the grantee/applicant informs us of the State Historic Preservation Officer's recommendation. Primary impact areas are those where ground will be disturbed for the project, such as the plant site, pumping station sites, access roads, and rights-of-way for interceptors. Areas in which the wastewater treatment facilities will have direct visual, odor, or aerosol effects may also be primary impact areas if they are likely to contain cultural properties of a type which are susceptible to such impacts and if the proposed project has been designed so as to be exposed to view or will emit odors or aerosols.

In areas where there are likely to be primary effects on cultural resources, grantees/applicants must identify in their facilities plans all properties listed in the National Register of Historic Places by consulting the latest issue of the National Register, including monthly supplements (40 CFR 6.214 (a)). The

current compilation is found in the Federal Register of February 1, 1977, (Federal Register, Vol. 42, No. 21, pp. 6198-6362); supplements are published in the Federal Register, usually on the first Tuesday of each month.

The grantee/applicant must also identify in the facilities plan all properties eligible for listing in the National Register within the primary impact area. To do this, they shall consult with the State Historic Preservation Officer (SHPO) to determine the extent and adequacy of existing information. Applicable criteria can be found in 36 CFR 800.10.

If existing information is insufficient to identify affected properties that may be eligible for the National Register, the SHPO will recommend to EPA the level of survey work needed to identify the presence of cultural resources. EPA's responsiblility to conduct or fund such surveys on primary impact areas shall be based on the degree of probability with which cultural resources can be expected to be found.

Intensive surveys should be conducted only when a sufficient amount of information exists to indicate that there is a reasonably high probability of discovering important cultural resources. In areas where such information does not exist, some or all of the following usually will suffice to determine whether an intensive survey is justified: a documentary search of reference materials on the cultural resources of the area, a walk-over reconnaissance survey for archaeological properties, and a "windshield" or photographic survey for historic and architectural properties. Cultural resource surveys shall be conducted by appropriate personnel with qualifications in the fields to be studied. When necessary, intensive surveys may include ground testing for archaeological resources, or the preparation of a comprehensive map locating historical and architectural resources. The information obtained from any necessary identification activities conducted shall provide the basis for determinations of eligibility for listing in the National Register in accordance with Part 800.4(a) of the Advisory Council procedures.

III. Implementation

The following procedures are set forth to comply with the above laws and EPA policy, and should serve as a basis for discussion for all interested parties. More specific and detailed procedures may need to be developed on a State-by-State basis.

1. Early in the facilities planning process the grantee/applicant should contact, or direct his consultant to contact, the State Historic Preservation Officer (SHPO) for the purpose of identifying all known historic, archaeological, and/or cultural resources.

2. This initial screening should occur at the point where the grantee/applicant is still examining several alternatives. A

known historic/archaeological site may be a reason for not selecting a particular alternative. If however, this alternative is then selected in the final screening process, the established procedures (36 C.F.R. Part 800) must be followed. A summary of these procedures can be found in Section V below.

3. Once the final alternative plan is selected, the grantee/ applicant should provide the SHPO with particular information on the selected plan. This should include site location, surrounding land use, interceptor routes, etc. Photographs of the area surrounding the site would be very helpful.

4. Based on this information the SHPO would make a determination whether or not a known or potential site would be affected by the proposed project. If a known or potential site would be affected by the proposed project the SHPO would make a recommendation that a preliminary reconnaissance survey of the area was needed. This will generally involve a site inspection by a qualified professional in the field.

5. The grantee/applicant shall retain qualified professionals in archeology, history and architectural history to undertake required surveys. Such professionals should be hired in consultation with the SHPO and State Water Pollution Control Agency. An example of proposed professional qualifications from the Office of Archeology and Historic Preservation National Park Service, U.S. Department of Interior is attached in Appendix I.

6. If the SHPO determines that a preliminary survey is not necessary, he would provide the grantee/applicant with a letter to this effect, which should be included in the facilities plan/ environmental assessment.

7. If the SHPO determines that a preliminary survey is necessary, the grantee/applicant must contact the EPA project officer through the State Water Pollution Control Agency for approval to conduct such a survey unless the need was defined in the grant agreement or sufficient funds budgeted for the survey in the Plan of Study. Should the results of the survey be negative, and satisfactory to the SHPO, he would provide a letter to this effect, which the grantee/applicant would include in the facilities plan/ environmental assessment. The cost of this preliminary survey would be an allowable Step 1 cost provided prior approval is obtained from the EPA project officer.

8. Should the preliminary survey indicate that an intensive survey is needed, the SHPO would provide the grantee/applicant and the State water pollution control agency with the scope of the necessary additional work and a cost estimate for its performance. In this submittal the SHPO should discuss the likelihood of discovering significant archaeological or cultural resources.

9. Work beyond the preliminary survey stage will require the specific approval of the State and EPA, before additional costs are incurred. Proposals for intensive surveys should be submitted by the State water pollution control agency to EPA with the State's recommendation. If approved, any additional costs will also be allowable Step 1 costs.

10. Should this additional work uncover significant archaeological or cultural resources, the established procedures for determining the eligibility for inclusion in the National Register of Historic Places shall be followed (36 C.F.R. Part 800). The facilities plan should demonstrate compliance with these procedures.

11. All facilities plans will be reviewed to be sure that applicants have included evidence of contact with the SHPO.

IV. Relationship of Historic Preservation Procedures to NEPA

1. NEPA and the historic preservation laws establish independent legal standards and procedures. The requirement of the latter must be complied with regardless of whether an EIS must be prepared.

2. However, the Advisory Council on Historic Preservation regulation, (36 CFR 800) and the Council on Environmental Quality Guidelines for the Preparation of Environmental Impact Statments (40 CFR Part 1500) direct that, where appropriate, NEPA review and review under the historic statutes should be coordinated and should be incorporated into a single set of documents.

3. Secondary impacts to known cultural resources will be considered under the procedures of NEPA.

V. Procedures for the Protection of Historic and Cultural Properties

The Advisory Council regulations (36 C.F.R. Part 800) apply whenever a property included in or eligible for inclusion in the National Register of Historic Places may be directly affected or if a signficant archaeological, historic or architectural resource is identified through the process outlined in Section III. The procedures required by the regulation are summarized as follows:

1. Identification of resources - The grantee/applicant shall identify, in consultation with the SHPO, all properties located within the area of the undertaking's potential environmental impact that are included in or eligible for inclusion in the National Register. Grantee/applicant will notify EPA if there is some question of the eligibility of a certain property. EPA will request a determination from the Secretary of the Interior. The Secretary of Interior will make determinations of eligibility and his opinion shall be conclusive for purposes of these procedures.

2. Determination of effect - For each property identified above, the EPA, in consultation with the State Historic Preservation Officer (SHPO), shall apply the "Criteria of Effect" (36 CFR 800.8) to determine whether the undertaking has an effect upon the property. If there is no effect, the undertaking may proceed.

3. Effect established - If an effect is established, the Federal Agency and the SHPO shall apply the "Criteria of Adverse Effect" (36 CFR 800.9) to determine whether the effect of the undertaking is adverse.

4. Finding of no adverse effect - USEPA shall forward its written analysis of no adverse effect and the SHPO's written views to the Advisory Council. USEPA's decision will follow the Advisory Council Guidelines, Appendix II. A finding of no adverse effect must be reviewed by the Executive Director of the Advisory Council. If he does not object to the finding within 45 days, the undertaking may proceed.

5. Finding of adverse effect - If there is a finding of adverse effect, the USEPA shall request in writing the comments of the Advisory Council, notify the SHPO of the request, prepare a preliminary case report, and proceed with the consultation process (36 C.F.R. 800.5). Facilities plan approval cannot occur during this process.

6. Consultation process - The consultation process shall involve the grantee/applicant, the state agency, EPA, the SHPO, the Executive Director of the Advisory Council, and, when appropriate, representatives of public and private organizations. The consultation process shall include the consideration of alternatives to avoid or mitigate adverse effects, and may include an on-site inspection and a public information meeting.

7. Memorandum of Agreement - When the grantee/applicant, state agency, EPA, the SHPO, and the Executive Director are able to unanimously agree on a plan to either avoid or to mitigate the adverse effects, they shall execute a Memorandum of Agreement acknowledging the avoidance or mitigation.

8. Failure to avoid or mitigate adverse effects - Upon the failure of the parties to agree and execute a Memorandum of Agreement, the Executive director shall request the Chairman of the Advisory Council to schedule the undertaking for consideration at the next Council meeting.

9. Council meeting procedures - The Chairman of the Council shall institute a 30-day review period for Memoranda of Agreement. The Chairman shall also decide on requests for consideration of the undertaking by the Advisory Council when no agreement has been reached. He may deny such a request if no member of the Council objects within 15 days of his decision and the project may proceed. If the Chairman grants the request, the undertaking must be considered at a meeting of the Council no less than 60 days from the date the request was received. The Executive Director must prepare a case report on the undertaking for the consideration of the Council. Oral statements shall also be made before the Council.

10. Comments of the Council - The Council shall issue and publish in the Federal Register their comments on the proposed undertaking. Agency action on the undertaking may then resume. However, the Federal agency must submit a written report to the Council describing its actions taken with respect to the undertaking subsequent to the Council's comments and their ultimate effect on the property involved.

Appendix I

APPENDIX C—PROFESSIONAL QUALIFICATIONS

1. Basic professional Occupation Standards. It is essential that any project proposal identify suitably qualified key professional personnel. Basic minimum qualifications for these types of personnel who most often serve as principal investigators and key consultants on contract projects are given below. Agencies which undertake or evaluate identification or data recovery projects using their own employees should also insure that these qualifications are possessed by appropriate staff members in a manner consistent with applicable Civil Service requirements.

Professional personnel of the Department of the Interior are available at all times to consult with other Federal, State and local agencies regarding the application of these criteria in given instances. For these services agency officials should contact the Chief, Office of Archeology and Historic Preservation, National Park Service, Department of the Interior, Washington D.C. 20240. In the following definitions, a month of professional experience need not consist of a continuous month of full-time work but may be made up of discontinuous periods of full-time or part-time work adding up to the equivalent of a month of full-time experience.

a. History. The minimum professional qualifications in history are a graduate degree in American history or a closely related field; or a bachelor's degree in history or a closely related field plus one of the following: (a) At least two years of full-time experience in research, writing, teaching, interpretation, or other demonstrable professional activity with an academic institution, historical organization or agency, museum, or other professional institution; or (b) substantial contribution through research and publication to the body of scholarly knowledge in the field of history.

b. Archeology. The minimum professional qualifications in archeology are (a) a graduate degree in archeology, anthropology, or closely related field, or equivalent training accepted for accreditation purposes by the Society of Professional Archeologists, (b) demonstrated ability to carry research to completion, usually evidenced by timely completion of theses, research reports, or similar documents, and (c) at least 16 months of professional experience and/or specialized training in archeological field, laboratory, or library research, administration, or management, including at least 4 months experience in archeological field research and at least one year of experience and/or specialized training in the kind of activity the individual proposes to practice. For example, persons supervising field archeology should have at least 1 year or its equivalent in field experience and/or specialized field training, including at least six months in a supervisory role. Persons engaged to do archival or documentary research should have had at least 1 year experience and/or specialized training in such work. Archeologists engaged in regional or agency planning or compliance with historic preservation procedures should have had at least 1 year of experience in work directly pertinent to planning, compliance actions, etc., and/or specialized historic preservation or cultural resource management training. A practitioner of prehistoric archeology should have had at least 1 year of experience or specialized training in research concerning archeological resources of the prehistoric period. A practitioner of historic archeology should have had at least 1 year of experience in research concerning archeological resources of the historic period. Experience in archeological research in the region where the project will be undertaken is usually desirable.

c. Architectural History. The minimum professional qualifications in architectural history are a graduate degree in architectural history, historic preservation, or closely related field, with course work in American architectural history; or a bachelor's degree in architectural history, with a concentration in American architecture; or a bachelor's degree in architectural history, historic preservation, or closely related field plus one of the following:

(1) At least two years full-time experience in research, writing, or teaching in American history or restoration architecture with an academic institution, historical organization or agency, museum, or other professional institution; or

(2) Substantial contribution through research and publication to the body of scholarly knowledge in the field of American architectural history.

d. Architecture. The minimum professional qualifications in architecture are a professional degree in architecture plus at least 2 years of full-time professional experience in architecture; or a State license to practice architecture.

e. Historical Architecture. The minimum professional qualifications in historical architecture are a professional degree in architecture or a State license to practice architecture, plus one of the following:

(1) At least 1 year of graduate study in architectural preservation, American architectural history, preservation planning, or closely related field and at least 1 year of full-time professional experience on preservation and restoration projects; or

(2) At least 2 years of full-time professional experience on preservation and restoration projects. Experience on preservation and restoration projects shall include detailed investigations of historic structures, preparation of historic structures research reports, and preparation of plans and specifications for preservation projects.

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from: 36 CFR, part 66, pp. 5382-5383

Appendix II

Guidelines for Making "Adverse Effect" and "No Adverse Effect" Determinations for Archeological Resources in Accordance with 36 C.F.R. Part 800

Archeological properties included in or eligible for inclusion in the National Register of Historic Places are generally nominated under National Register Criterion "d" (36 C.F.R. Part 60.6) which states that a property may qualify if it has "yielded, or may be likely to yield, information important in prehistory or history." While disturbance of archeological properties should be avoided, under certain circumstances, properties primarily significant for the data they contain can be said to realize their significance when this data is retrieved in an appropriate manner.

In such cases where a Federal undertaking (36 C.F.R. Part 800.3(c)) can result in the recovery of data from an archeological property on or eligible for inclusion in the National Register of Historic Places, the Agency Official should take the following steps to decide whether a "no adverse effect" determination can be made:

> The Agency Official shall, in consultation with the State Historic Preservation Officer (SHPO), apply the criteria set forth in Part I below. If these criteria are not met, the Agency Official shall comply with the procedures set forth at 36 C.F.R. Part 800.4(e) et seq. If the criteria are met, the Agency Official may issue a determination of no adverse effect for any data recovery program conducted in accordance with the requirements set forth in Part II below. Documentation that the criteria and requirements set forth in Parts I and II below have been met, along with the comments of the SHPO, shall be forwarded to the Council for review in accordance with 36 C.F.R. Part 800.4(d).

Part I: Criteria

1. The property is not a National Historic Landmark, a National Historic Site in non-federal ownership, or a property of national historical significance so designated within the National Park System.

2. The SHPO has determined that in-place preservation of the property is not necessary to fulfill purposes set forth in the State Historic Preservation Plan.

3. The SHPO and the Agency Official agree that:

   a. The property (including properties that are subsidiary elements in a larger property defined in Criterion 1) has minimal value as an exhibit in place for public understanding and enjoyment;

b. Above and beyond its scientific value, the property is not known to have historic or cultural significance to a community, ethnic, or social group that would be impaired by the retrieval of data;

c. Currently available technology is such that the significant information contained in the property can be retrieved.

4. Funds and time have been committed to adequately retrieve the data.

Part II: Data Recovery Requirements

1. The data recovery will be conducted under the supervision of an archeologist who meets the "Proposed Department of the Interior Qualifications for the Supervisory Archeologist (Field Work Projects)." (See Attachment #1.)

2. The data recovery will be conducted in accordance with "Professional Standards for Data Recovery Programs." (See Attachment #2)

3. A specified date has been set for completion and submission of the final report to the Agency Official.

4. Plans have been made for disposition of the material recovered after they have been analyzed for the final report. (See Attachment #3.)

5. Regarding the status of the affected property, documentation of the condition and significance of the property after data recovery will be provided the Agency Official and SHPO for forwarding to the National Register of Historic Places for action to include nominations, boundary changes or removal of National Register or eligiblility status, in accordance with National Register procedures (36 C.F.R. Part 60.16 and 60.17).

Attachment #1 Proposed Department of the Interior Qualifications for the Supervisory Archeologist (Field Work Projects)

The minimum professional qualifications for the Supervisory Archeologist are a graduate degree in archeology, anthropology, or a closely related field, or equivalent training accepted for accreditation purposes by the Society of Professional Archeologists, plus: (1) at least sixteen months of professional experience or specialized training in archeology field, laboratory, or library research, including (a) at least four months of experience in general North American archeology, and (b) at least six months of field experience in a supervisory role; (2) a demonstrated ability to carry research to completion, usually evidenced by timely completion of thesis, research reports, or similar documents.

For work involving prehistoric archeology, the Supervisory Archeologist should have had at least one year of experience in research concerning archeological resources of the prehistoric period.

For work involving historic archeology, the Supervisory Archeologist should have had at least one year of experience in research concerning archeological resources of the historic period.

Attachment #2 Professional Standards for Data Recovery Programs

1. The data recovery program should be conducted in accordance with a professionally adequate recovery plan (research design):

   a. The plan shall be prepared or approved by the Supervisory Archeologist and shall reflect a familiarity with previous relevant research;

   b. The plan shall include a definite set of research objectives, taking into account previous relevant research, to be answered in analysis of the data to be recovered;

   c. The plan shall provide for recovery of a usable sample of data on all significant research topics that can reasonably be addressed using the property or a justification for collecting data on a smaller range of topics at the expense of others;

   d. The plan shall specify and justify the methods and techniques to be used for recovery of the data contained in the property. (Methods destructive of data or injurious to the natural features of the property should not be employed if non-destructive methods are feasible.)

2. The data recovery program should provide for adequate personnel, facilities, and equipment to fully implement the recovery plan.

3. The data recovery program should insure that full, accurate and intelligible records will be made and maintained of all field observations and operations, including but not limited to excavation and recording techniques, stratigraphic and/or associational relationships where appropriate, and significant environmental relationships.

4. Particularly when a data recovery program is conducted upon a potentially complex historic or prehistoric property (e.g., an historic town site; a prehistoric site that may contain many occupation layers, cemeteries, or architectural remains), situations may arise or data be encountered that were not anticipated in designing the program. Adequate provision should be made for modification of the data recovery plan to cope with unforeseen discoveries or other unexpected circumstances.

5. The data recovery program should include provisions for dissemination of the results of the program. Generally, the final report should be made available to the SHPO, the State archivist, the State archeologist, the Departmental Consulting Archeologist of the Department of the Interior, and the Chairman, Department of Anthropology, Smithsonian Institution.

Attachment #3 Treatment of Recovered Materials

The recommended professional treatment of recovered materials is curation and storage of the artifacts at an institution that can properly insure their preservation and that will make them available for reserach and public view. If such materials are not in Federal ownership, the consent of the owner must be obtained, in accordance with applicable law, concerning the disposition of the materials after completion of the report.

APPENDIX C
LOCALLY SENSITIZED
ALTERNATIVE ANALYSIS

LOCALLY SENSITIZED ALTERNATIVE ANALYSIS*

As stated here and in the facilities planning guidelines no one method is best for all situations. Certain procedures fit some evaluation problems better than others. The following procedure emphasizes community involvement in the decision making process. It further separates economic considerations from environmental and social considerations. Although there are interactions between these topics, a final presentation of environmental costs and benefits versus economic costs is often helpful.

This procedure requires the creation of a community advisory group. This group will be utilized to identify alternatives, to design the evaluation criteria by assigning relative weights for each environmental and social category, and to evaluate each alternative according to this criteria. In this manner, the analytical process may be adapted to local conditions and sensitivities.

Community Advisory Group

The success or failure of this process lies in the equitable representation of all concerned persons in the project area. Certainly, local governmental bodies should be represented. Often the persons most knowledgeable of the project are city, county, and state representatives. Officials of the Public Works Department, the City Council, the County Commissioners, the local planning agencies, and the state have the facts essential for a thorough understanding of the project and the interactions with community development.

Secondly, and equally important, persons who will be most affected by the project must be represented. Usually this group will include citizens located in the project area close to areas where major impacts or alterations are anticipated. These persons often make themselves known by their own initiative. In some cases, some effort may be required to identify who may be affected, and locate the persons desiring to participate in the planning process. Invited involvement early in the process may avoid emotional reactive involvement later.

Thirdly, special interest groups should be included. Such persons as environmental group representatives, local developers, community club representatives, local academia, etc., can contribute considerable information and help provide a focus for complicated situations.

A working group, meeting weekly or bi-weekly, consisting of 10 to 20 persons is desirable. (From an accomplishment standpoint, less than 20 is a more workable group but it may be difficult to have adequate representation with less.) Regular meetings with sufficient time between each will help maximize attendance and allow participants time to reflect on the previous meetings and allow the project leader time to compile previous data.

* Extracted from "Environmental Assessment Statements Guidelines for Applicants" prepared by USEPA Region IV.

Evaluation Criteria

Initially, the group must understand its purpose, that being to sensitize the environmental analysis criteria to local conditions, and then to evaluate each alternative according to this criteria.

In order to perform these tasks, the group must first understand the general evaluation topics. The group leader is responsible for providing this information. It should be in the form of the background data (project objectives, project history, natural and man-made environmental inventories, maps, etc.) already gathered and compiled.

The following table may then be used for evaluating both primary and secondary effects. Changes, additions or other alterations to this table may become desirable and should be made where appropriate.

PRIMARY IMPACTS

Category	Natural Environment														Man-Made Environment												Score
	Atmosphere			Land					Water-Land Interface		Water							Resource Use					Other Projects Programs, and Efforts				
				Physical-Chemical			Biological				Phys.-Chem.		Bio.														
	Air Quality	Noise	Odor	Topography	Geology	Soils	Plants	Animals	Physical-Chemical	Biological	Quantity	Quality	Plants	Animals	Land Use	Arch., Hist., Cult., Recreational	Transportation	Materials	Energy	Water Programs	Community Services and Facilities	Taxes and Capital Budgeting	Federal	State	Regional	Local	Primary
Weighting Factor																											
Alternative I																											
Alternative II																											
Alternative III																											
Alternative IV																											
Alternative V																											

SECONDARY IMPACTS

Category	Man-Made Environment									Natural Environment									Score	
											Land		Water-Land Interface		Water					
															Phys.-Chem.		Bio.			
	Demography and Economics	Land Use	Arch.,Hist.,Cult., Recreational	Transportation	Resource Use	Water Programs	Community Services and Facilities	Taxes and Capital Budgeting	Other Projects,Programs and Efforts	Atmosphere	Physical-Chemical	Biological	Physical-Chemical	Biological	Quantity	Quality	Plants	Animals	Secondary	Total
Weighting Factor																				
Alternative I																				
Alternative II																				
Alternative III																				
Alternative IV																				
Alternative V																				

The citizens group then assigns weights for the various categories listed in the evaluation table according to their preception of its relative importance. One method to accomplish this task is to initially specify the percent importance to the major headings. Secondly, assign a percent importance, adding in each case to 100%, to the next lower heading. Multiply the major topic percent by the next lower percent to obtain the total percent importance. This process is continued until weights are assigned to all topics. A partial example of this procedure follows:

1. Assign weights to major headings

Primary	60%
Secondary	40%
Total	100%

2. Divide percentage assigned to major headings among next lower headings

Natural Environment	30%	
Man-Made Environment	30%	
Total Primary		60%

3. Divide percentage assigned to subheadings among next lower headings

Atmosphere	7%	
Land	8%	
Land/Water Interface	7%	
Water	8%	
Total Natural Environment		30%

4. Continue this process until the weights have been assigned to all the lowest divisions. The assigned weights on the included tally sheet should total 100%.

c. Alternatives Evaluation

The first task associated with evaluating specific alternatives according to the preceeding criteria is to identify all viable alternatives. The grant applicant should present the detailed descriptions of alternatives already identified as worthy of consideration and the logic leading to preliminary elimination of other possible alternatives. This presentation should be followed by receiving suggestions for additional alternatives to be evaluated. A simple majority vote might be used to include or not include an alternative. In some cases, alternatives which do not fully meet project objectives may be evaluated. For example, the "no action" alternative or alternatives in which technology does not allow attainment of objectives.

Generally, cost evaluations, resource utilization, and reliability determinations will be developed by the grant applicant or its agent. Resource utilization, such as energy, chemicals, construction materials and land commitments for both construction and operation for each alternative should be made available to the study group as well as the relative reliability of each alternative. It is essential that prior to performing the evaluations, the group have a thorough understanding of facilities locations, interceptor sizes and locations, service area, design flows, estimated effluent quality, effluent disposal methods and discharge locations, sludge disposal areas, air emmissions, noise and odor production, and other pertinent necessary for analyzing the effects of each alternative.

Following familiarization with an alternative and its effects on each category in the evaluation criteria, the relative beneficial or adverse effect is quantified as:

Highly Unfavorable	= -3
Moderately Unfavorable	= -2
Unfavorable	= -1
Neutral	= 0
Favorable	= +1
Moderately Favorable	= +2
Highly Favorable	= +3

A rating is placed on each category for each alternative. This rating is then multiplied by the category weighting factor and the resultant scores for each criteria added to obtain the overall environmental rating for that alternative.

The alternative with the highest score is not necessarily required to be the chosen alternative, although reasons for not choosing the most environmentally sound project must be fully explained. Costs may be one overriding reason for choosing an alternative not having the highest score.

The applicant's consultant may wish to have the assessment statement project team evaluate the various alternatives. Persons with specific expertise, such as Sanitary Engineering, Urban Planning, Economics, Biology, Physical Science, etc., can give a technical evaluation irrespective of local sensitivities.

d. Alternatives Cost Evaluation

As previously stated, cost evaluations should be prepared and presented in the assessment. A final comparison between environmental ranking and cost ranking will allow a rapid determination of the costs associated with avoiding certain adverse impacts and with achieving certain additional benefits.

As in the facilities planning alternative evaluation methodology, capital costs and operating costs should be quantified in terms of total costs and average annual costs. Costs borne by private concerns should be indicated and the relationship to total costs discussed. For more detail see the facilities planning guidelines and the methodology in the preceding section.

D. Summary

The amount of detail indicated in the preceding two methodologies may be more detailed than necessary for some smaller or non-complex projects.

In all assessment statements though, certain topics should be addressed and evaluated among the alternatives. They are:

(a) the degree to which each selected alternative will solve the identified problems and meet the other objectives stated in Chapter I (any differences in meeting compliance timetables should be included);

(b) capital, maintenance and operating cost;

(c) adverse environmental effects - for collectors and interceptors include a specific statement on whether development of any area will be encouraged; for a wastewater treatment facility include a statement about the compatibility of the selected site with its current and future surroundings and what will be done to reduce incompatibility;

(d) other undesirable aspects;

(e) most desirable aspects;

(f) if rejected, the major reasons for rejection;

(g) if accepted, the major reason for acceptance.

When there is no perceptible difference between alternatives during the comparison process, a statement to that effect is sufficient. At the completion of each major group of comparisons, the alternative(s) selected as optimum and the reasons for selecting it should be summarized.

If a system contains a subsystem component designed for a period less than the life of the entire facility, at which time it will be replaced or upgraded, the comparative analysis should reflect this. The discussion should also emphasize those alternative systems that appear promising in terms of environmental protection. Different designs for systems that are essentially identical with respect to environmental effects should be considered only if their costs are appreciably different. The discussion should also include alternatives which provide levels of environmental

protection above those required of the proposed facility when, although not necessarily economically attractive, they are practicable on technological grounds.

There are, of course, limitations on the extent to which an Assessment Statement can evaluate all of the social and economic benefits and costs of the construction and operation of a wastewater treatment facility that may have a design life of 20-25 years -- so common sense should prevail.

The concept of centralized vs. decentralized systems is receiving increased attention in current system proposals. When evaluated on the cost of the facilities alone, the analyses often neglect to discuss adequately the residential, commercial and industrial development that a centralized project can induce. Their vast network of collectors and interceptors often opens up many new areas for development, or more rapid growth. The comparative analysis should specifically speak to the environmental implications of each approach.

APPENDIX D
SECONDARY IMPACTS EVALUATION

Introduction to Appendix D

This appendix includes excerpts from a report entitled "Secondary Impact of Regional Sewerage Systems", Vol. 1, June 1975 prepared by the State of New Jersey Department of Community Affairs, Division of State and Regional Planning under a grant from the United States Department of Housing and Urban Development under the Urban Planning Assistance Program authorized by section 701 of the Housing Act of 1954, as amended. This information is offered as assistance in evaluating the secondary impacts resulting from the construction of sewerage systems. Some of the information presented relates directly to the State of New Jersey. However, most of the information is of a general nature. The manner in which it can be applied in evaluating the secondary impact of a particular project depends on the nature and scope of that project.

CHAPTER 1

EXECUTIVE SUMMARY

INTRODUCTION

The following research project was jointly conceived by the Division of Water Resources (DWR), Department of Environmental Protection and the Division of State and Regional Planning (DSRP), Department of Community Affairs. It began on July 1, 1973, and was financed, in part, by the United States Department of Housing and Urban Development as part of the DSRP Annual 701 Grant Award. The purpose of the assignment was to examine through analysis of actual case studies in New Jersey the secondary or long-range effects stemming from the construction of large sewerage systems. To the extent possible, these effects would be identified, described and measured so that they could be properly addressed in the water quality planning and management process.

The DSRP obtained the consulting services of the project team responsible for the report *Water Quality Management: New Jersey's Vanishing Options.*[1] Thus, by combining their intimate knowledge of the Federal and State water quality program and the knowledge and experience of New Jersey's growth and development of the state planning agency, a unique research capability and understanding resulted which probably could not have been reproduced singularly or under other combinations which excluded either one group or the other.

The need for this study in New Jersey arose from the concern that new regional sewerage facilities may be spawning rapid population growth and that such growth is most often unplanned resulting in adverse impacts on water quality and the total physical environment, as well as on the fiscal resources of municipalities. For example, it has been documented in Fairfax County, Virginia,[2] that rapid growth in an area newly served by sewers resulted in a dramatic increase in the rate of growth and considerable run-off and sedimentation which soon had the effect of making the water quality in streams and reservoirs worse than it was before the new sewerage system was installed. In other words, if sewerage systems are not carefully planned with the impacts of growth in mind, the remedy can be more damaging than the disease.

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1. Dunka, John K. and Westwater, James D., *Water Quality Management: New Jersey's Vanishing Options,* County and Municipal Government Study Commission, Trenton, June, 1973.

2. "Suburban Growth – A Case Study," Population Bulletin. (Population Reference Bureau, Inc., Washington, D.C. 1972).

Secondary Impacts

Secondary impacts of sewerage systems can be viewed in a number of ways. Several years ago Congress addressed secondary impacts in the National Environmental Policy Act[3] and the Council on Environmental Policy subsequently noted that:

> Many Federal actions, in particular those that involve the construction or licensing of infrastructure investments (e.g., highways, airports, sewer systems, water resource projects, etc.), stimulate or induce secondary effects in the form of associated investments and changed patterns of social and economic activities. Such secondary effects through their impacts on existing community facilities and activities, or through changes in natural conditions, may often be more substantial than the primary effects of the original action itself.[4]

Federal statutes now require secondary impacts to be analyzed where Federal monies are supporting infrastructure development. Figure 1 portrays some of the potential secondary impacts of regional sewerage systems.

In requesting this study, a special concern of DWR officials was to find ways to make certain that sewerage facilities, designed to control existing water pollution problems, would not appropriately be oversized. The pressures are great for building excess capacity into the new systems. Builders are keenly aware of a need for large capacity sewage treatment systems, as are local officials seeking ratables. With nearly 100 municipalities in the state under building bans, the demands for expanding or improving treatment are increasing. Ways must be found to fund sewerage facilities construction which, as a side-effect, do not result in windfall profits at the public expense by way of increased land values. At this point, however, with a conspicuous lack of commonly held and enforceable land use policies at both the State and local level, and with 208 and 303e planning programs now being utilized, efforts to evaluate and control the size and impact of regional sewerage systems must be directed through the construction grants program. It is apparent that secondary effects can be minimized through careful planning, review and management of Federal and State grants-in-aid.

The key to understanding and utilizing this document is to recognize that it is the construction grants program that implements planning decisions. Because of the way Federal policies are articulated in the National Environmental Policy Act and in the Federal Water Pollution Control Act Amendments of 1972,[5] actions to deal with secondary impacts must be made in terms of the construction grants program. If a project is built without using Federal funds, there is no Federal requirement to analyze secondary impacts. It is the grant, not the project itself, that enables the Federal government to require analysis of secondary impacts and to modify the project if necessary. An exception to the above is the requirement under NPDES for an analysis of the secondary impacts for all new facilities discharging into waterways, regardless of the nature of funding. Though neither the states nor EPA has as yet exercised this authority, they do reserve the right to do so.

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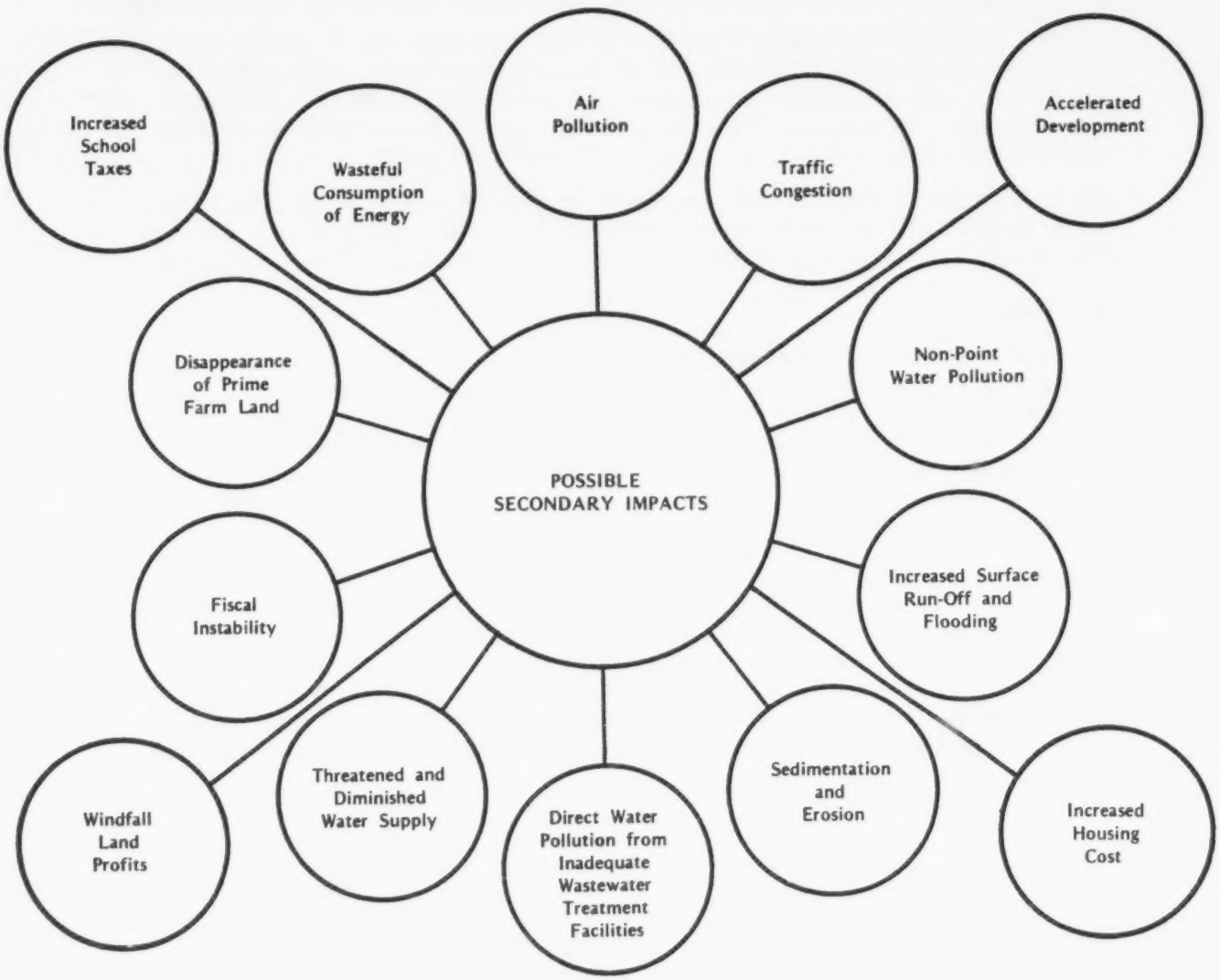
3. *National Environmental Policy Act of 1969,* 42 U.S.C., Section 4321 et seq.
4. Council on Environmental Quality, "Guidelines for Preparation of Environmental Impact Statements," *Federal Register,* Vol. 38, No. 147, Part II, August 1, 1973.
5. *Federal Water Pollution Control Act Amendments of 1972,* Public Law 92 – 500, 92nd Congress, S.2770, October 18, 1972.

FIGURE 1


POSSIBLE SECONDARY IMPACTS
Increased School Taxes
Wasteful Consumption of Energy
Air Pollution
Traffic Congestion
Accelerated Development
Disappearance of Prime Farm Land
Non-Point Water Pollution
Fiscal Instability
Increased Surface Run-Off and Flooding
Windfall Land Profits
Threatened and Diminished Water Supply
Direct Water Pollution from Inadequate Wastewater Treatment Facilities
Sedimentation and Erosion
Increased Housing Cost

The massive amounts of Federal money available for sewer construction in New Jersey are significant to this study. Figure 2 shows the recent history of Federal funding for sewerage facilities construction in New Jersey as compared with Federal highway funding. The figure indicates that sewerage facilities construction funding for New Jersey in FY 1975 is $253,000,000, while highway funding is $158,000,000. The dollar amounts for sewerage facilities construction seem even more staggering when one realizes they would have been almost double that shown for Fiscal Year 1974 and Fiscal Year 1975 if it had not been for a presidential impoundment of funds. The U.S. Supreme Court has effectively released all of the impounded funds, so it appears that annual funding for sewerage facilities construction in New Jersey will continue to increase. The State has estimated that it will need more than $12 billion for total clean-up by 1990[6] and that annual expenditures could go up to $500 million.[7]

On the policy side, this report is designed to encourage discussion of current grants management policies and procedures. All of these recommendations were made with the foremost goal of assisting in eliminating the considerable backlog of water pollution problems in New Jersey. These recommendations aim to link land use planning considerations more closely to the issuance of construction grants.

On the program management side, the report recommends formalized planning procedures, guidelines for analyzing secondary impacts, and criteria for developing the State Priority List. It is a purpose of this report to assist in promoting their consideration.

The Report

First the report discusses secondary impacts in some detail. Three case studies are discussed in Chapter 2, primarily to examine the relationship between sewerage facilities and development patterns in New Jersey. It is shown that the availability of sewerage facilities is one of the most important factors in locating residential, commercial, and industrial developments. It is this fact that leads DSRP to believe that more comprehensive approaches should be utilized in dealing with secondary impacts and planning for sewerage systems.

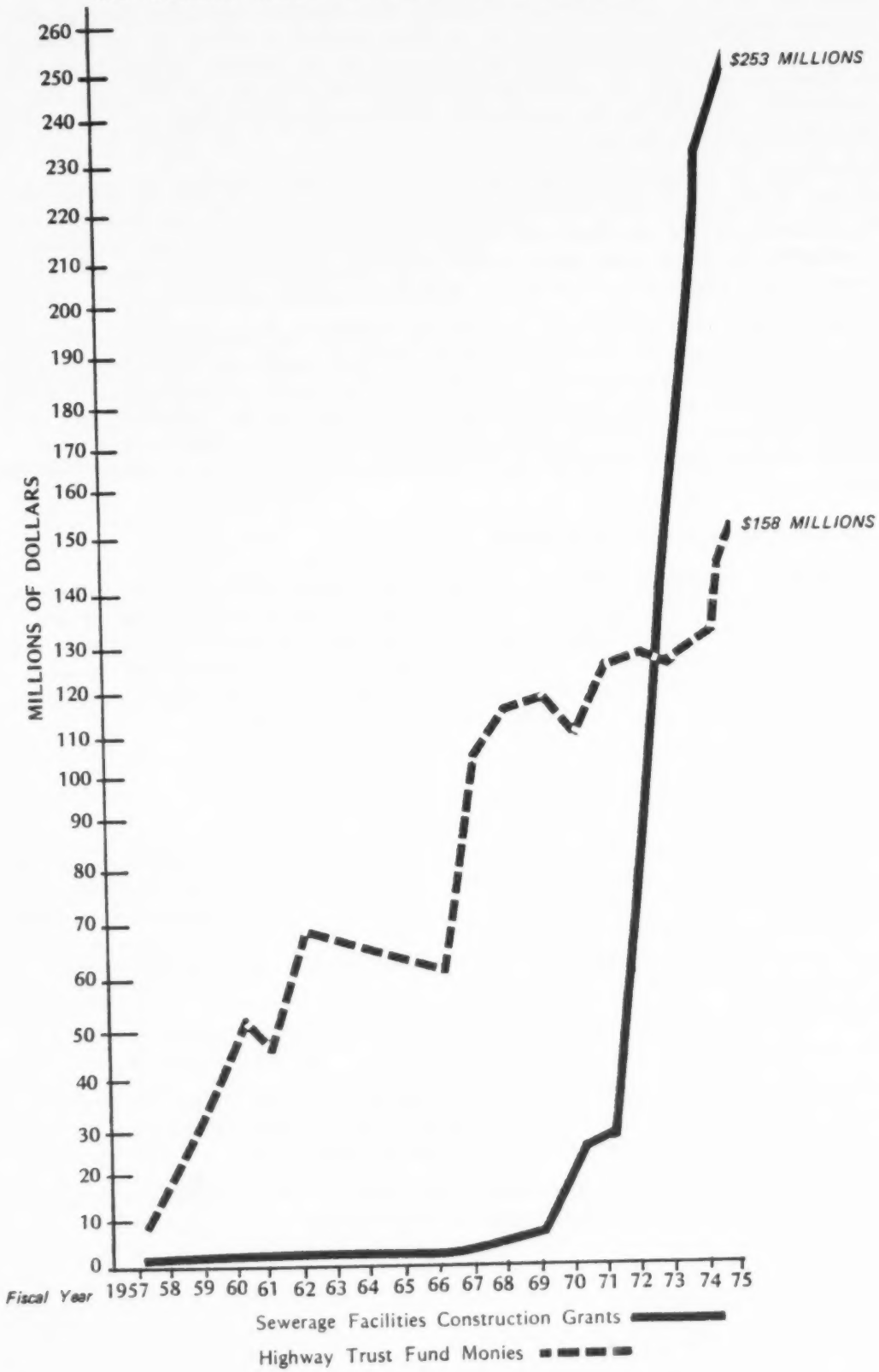
Chapter 3 reviews both the Federal and State water quality management programs, which define, in large part, what actions municipalities may take regarding sewers. Because the construction grants program is of such magnitude (see Figure 2) sewerage facilities can be viewed not only as a means of cleaning up the State's waters, but also as a major tool for influencing growth configurations. However, this huge grants program must be utilized by all levels of government to insure that it will be more a land and environmental management tool rather than just a public works program.

6. Walter H. Waggoner, "$12 Billion Price Is Put on Jersey Water Clean-Up," *The New York Times*, Sunday, September 18, 1974. New Jersey Section.

7. Commissioner Bardin quoted in "Sewage Project Boon to Building Trade." *The New York Times*, Sunday, October 27, 1974. New Jersey Section.

FIGURE 2

COMPARISON OF FEDERAL SEWERAGE FACILITIES CONSTRUCTION GRANTS AND HIGHWAY TRUST FUND MONIES FOR NEW JERSEY



In Chapter 4, the problems emanating from the water quality management programs are identified, especially those that could result in adverse secondary impacts. To enable the reader to view those problems as they manifest themselves in a specific situation, a case study was conducted in Ocean County. It points up the conflicts that arise when project engineers attempt to distinguish between reasonable capacity for future growth and the oversizing of facilities. This section also discusses with considerable emphasis on the construction grants program the underlying causes that force these issues to surface.

Three ways of managing and controlling negative secondary impacts are posited in Chapter 5. First, improved planning procedures and requirements are detailed. Then the administration of the State and Federal construction grants program is viewed as probably the single most powerful tool for achieving resource management goals. Finally, the strengthening of regulatory controls is offered as another course of action.

Chapter 6 details the conclusions and presents specific recommendations to the Division of Water Resources. Detailed discussions of case studies and guidelines for evaluating secondary impacts are in the Appendix to the report. In conjunction with its overall recommendations, the report suggests a methodology for evaluating secondary impacts which will provide the tools needed to better control negative secondary impacts, improve the construction grants program, and enhance New Jersey's environment.

CONCLUSIONS OF THE RESEARCH

The following conclusions offer a summary of the report's research effort. After the general conclusions that give an indication of how powerful a growth tool sewers have become, conclusions about secondary impacts and the factors conducive to their occurrence are spelled out. In combination, these conclusions identify the nature and degree of the problems emanating from the expenditure of large sums for sewerage facilities in the absence of a definitive State land use program.

Conclusions: General

- Today, outside of the general economy, sewers are the critical ingredient and the guiding force for growth in New Jersey. As the cost of land and construction rises, more townhouses and multi-family units will be built in proportion to single family homes. Sewers are essential for this higher density construction. As a result, the role of sewers as a growth determinant will become even stronger in the future.
- The Federal construction grants program for water pollution control is proving to be a powerful stimulus to growth in the less developed areas of the state.
- The current program contains funding or proposals to fund projects in developing areas, some of which include excess capacity, e.g., Gloucester and Ocean Counties and the Wallkill, Rockaway, Pequannock and Wanaque basins.
- Population projects, elusive, inconsistent, and undependable, are the anchor to which sewerage design and investment are usually tied.

- Under the current State Priority System, the protection of waters classified high quality is heavily weighted. High quality waters are found throughout the State, but particularly in the less developed areas, where they also serve as sources of water supply or are valuable for recreation. Construction grants money should be limited in these areas where secondary impacts are likely to be most severe.
- While excess future capacity is being built into some of the facilities which are funded each year, severe water quality problems persist in many other areas of the State.
- Rural areas have not been considered a high priority resource and as a result development is taking place in these areas, thereby generating the need for services to be extended across intermediate vacant land.
- The State of New Jersey at this time has no official policies toward growth nor any established land use program. Because of this, actions taken by Federal and State agencies to clean up the waters cannot be carried out within a framework of commonly agreed upon land use objectives. Furthermore, in most cases municipal planning and zoning controls have not stood up against the pressures created by newly available sewer capacity. Few municipalities have carried out the necessary environmental, fiscal, and social analyses to determine the optimum pattern of development, population limits, and timing for their own growth. Until there are some established land use policies to guide growth in the state or until resource capacity studies can effectively be tied to local planning for growth, land use planning will be done either via the back door by agencies building public facilities or not at all. This does, indeed, put a large burden of responsibility upon those agencies building major public facilities like sewers.

Conclusions: Local Attitudes

- Pressure for continued economic and physical growth has been a fact of life in New Jersey government, and sewerage facilities are perceived as a primary ingredient to such growth.
- Federal grant programs are viewed as windfall, one-shot endeavors by local officals. It has been their judgment that as much aid as possible should be obtained for the municipality, while still being able to meet the debt service payment on the local share costs while the opportunity lasts.
- The current policy of 90% grants for sewerage facilities virtually removes local incentive to control costs or to associate the size and cost of a project with actual current sewerage needs and the development future of the community.
- Engineering consultants normally advise the local authority that it is better to build all at once for maximum capacity than to carry out the construction in stages.
- Population growth stimulated by new overextended sewerage system implies increased municipal service costs, yet future service costs are not analyzed to enable local officials and the community to understand the fiscal impact of new development fostered by sewerage systems.
- In most of the cases reviewed, the local planning process is not sufficiently developed to utilize sewerage planning as a device to carry out comprehensive plans.

- As soon as a project with excess capacity is on line, a primary goal of the local operating agency is to attract as many users as possible, often in conflict with the stated goals of available master plans to control and manage growth.

Conclusions: State Perspective

- By mid-year 1974, the Department of Environmental Protection began to address the responsibility of managing the total amount of dollars available from Federal and State sources and to spread it as far as possible to resolve water quality problems throughout New Jersey.
- New Jersey's construction grants priority list is developed annually to facilitate the distribution of Federal and State grants, but its changing criteria are due to changing Federal requirements, thus compounding the problems of aligning planning policy with the awarding of grants.
- Absence of current detailed written guidelines from the State leaves the sewer planning process largely to engineering consultants for interpretation and implementation.
- The lack of uniform guidelines for the analysis of secondary impacts results in inadequacy to reckon with long-term impacts of sewerage facilities despite requirements of the National Environmental Policy Act.
- The size of the proposed system is often not related to the scope of the problems to be resolved. The desires of municipal officials and their consultants for maximum capacity systems, rather than State policy, become the guiding force in developing sewer plans.
- The proliferation of package treatment plants, which are often poorly located and even more often poorly operated, is literally a "foot in the door" to a consolidated sewerage system and its attendant secondary impacts.
- The expenditure of vast amounts of public funds has resulted in windfall benefits to landowners in the form of increases in property value. At the same time, the public does not recoupe this unearned increment of value obtained at its expense.

RECOMMENDATIONS

Two overriding themes have predominated in the formulation of recommendations in this report. First, how should limited Federal and State funds be utilized to accomplish the overall goals of the Federal Water Pollution Control Act Amendments of 1972? Second, how can improved planning and analysis of secondary impacts assist in achieving the goals of the Federal Act, while reducing overspending on single projects?

Recommendations: General

- The State of New Jersey should regulate investment in sewerage systems to insure that the considerable sums it controls are used first to eliminate the tremendous number of water quality problems across the State and only secondly to provide extra capacity for future populations.

- The State should incorporate in its annual Water Pollution Control Plan (1) an articulation of overall State construction grant program goals and objectives (2) a programming of how and when various types of water pollution problems will be considered for solution, and (3) an association of the total dollars available to the problems at hand.
- The funding of large amounts of excess capacity should be discouraged, because such excess capacity is a powerful stimulus to growth, and uncontrolled growth brings with it a host of new problems, particularly ones affecting water quality.
- The objectives of each regional sewerage project should be defined in the early planning stages and the scope of the solutions carefully related to the scope of the problems.
- Rural areas in New Jersey should be considered a highly valued resource and protected from extensive sewerage systems where need for service is not demonstrable.
- In the absence of a State land use program, the best course of action is to keep development options open for the future as much as possible, rather than locking the State into configurations dominated by sewerage plans. This could be done by concentrating investment on the severe problems in already built up areas and only investing in minimum essential capacity in those developing areas where problems exist and headwaters or recreational waters must be protected. A further step in carrying out this course of action should be increased enforcement of the regulatory power of the DEP in dealing with septic systems and package treatment plants.
- Devices to either more equitably distribute the increased development capacity created by the construction of the system, or to enable the public to recapture the unearned increment of value accruing to property owners within a service area, or both, should be explored.

Recommendations: Construction Grants Program

The Priority System

- See that the goals of the State are reflected in the priority system.
- Set the priority list in rank order so that it reflects the relative importance of the criteria.
- Establish a fund for Step 1 projects and a separate fund for Step 2 projects.
- If permitted, separate lists should be created to include:
  - Segmented projects from previous years
  - Treatment plants, pump stations and interceptors
  - Other projects, such as collection systems and separation of combined systems
  - Step 1 projects
  - Step 2 projects.
- If separate lists are not permitted, a "multipler" (or weighting factor) should be introduced into the priority system which would in effect separate segmented projects, treatment plants and other projects from one another. The regulations clearly permit Step 1 and Step 2 projects to be set aside.

- Allow flexibility for crisis situations which emerge, without suggesting that all projects will be funded.
- Establish a formal procedure whereby the State may review a project at each stage of the facility planning process and exercise the option to modify the scope of a project at any time prior to certification to the Environmental Protection Agency.
- Include only those elements of the project which are considered to be essential. Do not enter projects on the list until they have successfully passed a review or eligibility conference where the applicant and the State have agreed upon the scope to be included.
- Provide only for the most immediate needs in areas with demonstrated high growth potential. Allow for modest additional capacity at treatment plants and minimize the expenditure for large interceptors in regions where the ultimate capacity in the region is uncertain. Do not build some interceptors until the need is clear in order to prevent overextending systems.
- Spend dollars as soon as possible. Spending should be contrasted to the mere act of obligating monies to applicants, which may not be spent for several months or even years. As of mid-year 1974 this has begun through segmenting of the projects.
- Separate projects into stages or segments which coincide with a phased construction program. Establish an approach to scheduling the construction, and reserve this approach only for the largest projects, say those greater than $10 million. This has been initiated as of mid-year 1974.
- Assure funding of segmented projects in subsequent fiscal years by establishing a premium class of those projects which would be funded prior to new projects. Allow the option that certain projects would not be permitted this favorable consideration.

Facilities Planning

- Prepare a written guidance document which would explain in detail the standards and procedures for local performance of facilities planning requirements consolidating and unifying existing State and Federal guideline documents.

Secondary Impacts

- Establish special procedures and guidelines for the analysis of secondary impacts. (See Appendix 1)
- Specify procedures by which elements of secondary impact analysis, where appropriate, can be brought into the planning process at an early stage rather than after major decisions have been made and the Environmental Assessment Statement is being prepared. A broad-based environmental review procedure should be considered.

Funding

- Establish a policy whereby the State would establish criteria for the amount of state aid to be granted (up to a maximum of 15%) which would favor dire need projects and which would disfavor the oversizing of new and expanded systems.

- Permit State and Federal governments to fund only essential capacity.
- Reduce initial expenditures by shortening the design life of wastewater transmission and treatment facilities.

Recommendations: Regulatory Controls

- Improve the basis for review and approval of package treatment plants. Land disposal technology should be utilized where possible.
- Establish a formal policy favoring operation of such facilities by governmental units, and minimize the creation and continuance of these franchises.

APPENDIX I

EXPLANATION OF THE METHOD FOR EVALUATING SECONDARY IMPACTS OF REGIONAL SEWERAGE SYSTEMS

The purpose of investigating the seven categories in these guidelines in the order suggested is to gain an understanding of the growth-induced impacts which may result from each of the alternative systems which have been proposed. It is necessary to determine the probable rate and pattern of growth in the service area which will result from each alternative and then to analyze the impacts of that growth. Following is a summary of the rationale behind the guidelines.

SECTION I

Determine pressure for development. To get an indication of the amount of pressure for development in the area, determine what development has occurred since 1960 and what is happening now. Separate by type of land use. This will help to determine whether or not there will be a high rate of growth once the sewers are in. Trends should be adjusted for short-term influences.

SECTION II

Measure vacant, developable land. To get an idea of how much growth could occur, determine how much vacant, developable land there is. Also indicate natural and physical limitations of the land for development.

SECTION III

Compare proposal with existing plans. To see if the proposed project conflicts in any way with existing plans, compare a map of the service area showing the location of the proposed system with plans and future land use plans of municipalities, counties and the State, including plans for highways, parks, reservoirs, and environmentally critical areas. (Include such agencies as the New Jersey Highway and Turnpike Authorities and the Atlantic City Expressway.)

SECTION IV

Evaluate municipal attitude toward growth. The level of land use planning in an area will be decisive in determining potential secondary impacts so it is necessary to evaluate the quality of the planning effort which is being carried out in each municipality. A checklist of indicators is given with which to measure the degree of commitment to basic planning objectives.

SECTION V

Estimate growth. While it is difficult to estimate growth when counties and municipalities have tended to simply accommodate growth as it comes along rather than setting limits and specifying timed stages for development, this task must be carried out in as enlightened a manner as possible. It is necessary to estimate the amount and pattern of growth which will occur in the ten years after construction. This estimate will be based mainly on previously gathered information, such as the amount of vacant, developable land, municipal policies and attitudes, the pressures for development in the area, and the development trends, e.g., PUDs.

SECTION VI

Measure impact. All the previous steps lead up to this one, which should be considered the heart of the analysis. Using the estimates of the pattern and rate of growth above, describe the potential impacts of this growth on the individual municipalities and the region.

SECTION VII

Weigh alternatives. This section should be a thorough evaluation of the alternative proposals in terms of the long-range impacts discussed in the previous section. If possible it should conclude with a recommended project proposal which would have the least adverse impact while adequately solving the current water quality problems of the area. The possibility that all alternatives represent too large a solution to existing problems should not be ignored.

GUIDELINES FOR EVALUATING SECONDARY IMPACTS OF REGIONAL SEWERAGE SYSTEMS

The environmental assessment which accompanies each facilities plan must include a discussion of the secondary impacts of the proposed facility. According to federal regulations, secondary impacts include changes in the intensity and distribution of the population, and changes in the human use of the land. Because secondary impacts are a measure of long-range and lasting effects of a project, analysis of secondary impact should be at least as lengthly and detailed as that for primary impacts. The following guidelines are offered to assist in addressing this question.

1. Growth Experience of the Service Area

A. Describe the growth experience of each municipality and the whole study area since 1960, including changes in size of population, types of residential development, types of industrial and commercial development, and changes in other major uses of land, such as farming. Map this information.

B. How does this growth experience in the service area compare with the rest of the county and with the state as a whole in terms of population, employment, building permits granted, industrial development?

C. Rank in order of importance the major factors influencing growth in the area and give rationale behind choices; for example:

proximity to metropolitan areas
accessibility – highways, public transport
natural resources – water supply, aquifers, prime farmlands
natural features – mountains, streams, ocean
inexpensive land
buildable land
public facilities
etc.

D. Determine the degree of development activity in each municipality in the sewer service area by showing how much development by type – commercial, single family residential, apartments, PUDs, industrial, etc., has been approved in the past two years. Look also outside the specific service area for indications of development pressure in the region including planned capital facilities.

1. Based on recently proposed subdivisions and building permit applications, estimate the amount of residential development that is likely to be constructed in the next few years. Determine the number of potential dwelling units which will probably be built without the proposed project.

2. Indicate lands which are known to be held by speculators and developers. In New Jersey a copy of every deed recorded with the County Clerk's Office is sent back to the municipality. So information relating to changes in ownership should be available at municipal offices. The county agricultural agent will be a useful source of information in this regard.

II. Existing Land Use

A. On map or photo quad of the service area at U.S.G.S. scale, map publicly owned lands, floodplains, wetlands, etc.

B. Map undeveloped lands and determine the number of vacant acres. Subtract publicly owned lands, floodplains, wetlands, slopes exceeding 15%, etc. to determine the number of vacant, developable acres in each municipality and in service area.

C. List any major deterrents to growth, both natural and other, e.g., lack of water supply, lack of sewers, bad drainage, difficult terrain, stream loading limitations, etc.

(This information will have already been obtained for the inventory of natural resources required in the preparation of a facilities plan.)

D. At same scale as above, preferably as an overlay, map current zoned densities, taking these from each municipality's zoning map and ordinance. Deduce from this current zoned capacity of the service area.

III. Relationship to Future Plans

A. Study future land use plans where they exist of each municipality in the service area. Indicate the status of these plans. Are they official, adopted plans? When were they prepared and adopted? If no plans exist, review the zoning ordinance. If neither exists, so note.

B. Describe all other applicable planning for the service area, including regional and county future land use plans, state highway plans, state open space plans, plans for environmentally critical areas, i.e., floodplains, wetlands, coastal zones, etc. Confer particularly with county planners for this overview. Are local plans consistent with these county, regional and State plans? Point out major discrepancies. Separate planned expenditures from general plans.

C. How does the provision of the proposed facility relate to the above plans? Does it propose sewers in areas designated for conservation, open space, recreation or in environmentally critical areas? Where conflicts exist, how is the system designed to deal with them?

IV. Status of Planning in Each Municipality

A. What is the attitude toward growth in each of the participating municipalities? Determine this by examining municipal records, interviewing public officials, planning consultants, citizens, and reviewing area newspapers.

B. How much has each municipality in the service area spent on planning in each of the last five years? Show the relationship between the amount of vacant, developable land they have and the amount of money they spend for planning.

C. Describe the degree to which each municipality has dealt with the following checklist of basic planning elements:

1. Inventory of natural resources, including geology, soils, topography, water quality, water supply.
2. Open Space Needs Study and Open Space Plan.
3. Housing Needs Study and Housing Plan.
4. Collector Sewer Master Plan.
5. Adopted Master Plan which encompasses the above elements.
6. Provisions in zoning ordinance providing for "timing of development," clustering, PUD and PURD.
7. A six-year capital program.
8. Describe municipalities' current debt status and capacity.

D. Evaluate the consistency of the municipalities' land use ordinances and their plan. (Note inconsistencies in terms of impact on system design.)

E. Examine the records of the Zoning Boards of Adjustment for the past five (5) years in the service area.

1. What is the frequency of use or "d" variance?
2. To what extent are they a departure from the plans and adopted land use regulations; note especially:
   a. changes in density
   b. marked changes in type of use
   c. marked changes in waste discharge characteristics of permitted uses
3. Discuss the potential impact on system design where significant Zoning Board activity has been occurring.

V. Estimating Growth

The Environmental Assessment must take into account the assumption that putting through sewer interceptors will stimulate pressures for development. The growth which will follow the construction of the project must be estimated in order to deduce the potential impacts on natural resources, public services, fiscal policy and the character of the area.

A. For each alternative indicate on a map of the service area (no smaller than U.S.G.S. scale) the location and size of proposed sewer lines and treatment plants. Aerial photographs available at U.S.G.S. scale, 24,000:1, is a useful base on which to lay out proposed systems.

   In light of municipal policies, proposed developments, and amount of development pressure discussed above and with careful analysis of the vacant, developable land which will be served by the proposed system, estimate the population which will occur in the service area within the 10 years following the construction of the proposed project. This could be a range rather than a single figure. It will be necessary to estimate the spatial pattern, density and general housing types which will probably occur. Where assumptions are made, they should be clearly stated and justified.

B. For purposes of comparison, also estimate an ultimate population for the service area based on the design size of the pipes, assuming full capacity use. Evaluate the engineer's assumptions about per capita use and peak flows as well as his methods for computing pipe sizes.

C. Under current state and local policies toward zoning, floodplains, critical areas, septic tanks and package treatment, what growth would occur if the project were not constructed using the 10 year time frame.

VI. Measuring Potential Impact of the Proposed Facility (and Alternatives).

Using growth estimates from Section V. A., determine the potential impacts of development on: regional economic patterns, transportation, local sewer collector systems, health services, solid waste disposal, schools, municipal fiscal structure, air quality, water supply, flooding, water quality downstream effects and the character of the region.

A. The impact of each of these should be analyzed for each municipality in the service area using referenced standards.

   1. *Regional economic patterns.* What will be the impact (positive and negative) of growth on the following economic activities: agriculture, industrial development, retail business and services? This analysis should include geographic as well as measured aspects.

   2. *Transportation.* How many additional cars for residents, commuting-in traffic and service vehicles will be generated? What new roads and road widenings will be necessary to serve this additional traffic? Estimated pattern of development under Section V.A. of these Guidelines will be useful here. Approximate costs. How will the burden be divided up between federal, state, county and local government?

Will a public transportation system be possible within the region if it doesn't exist now?

3. *Local sewer collector systems.* How much sewerage will have to be constructed by each municipality? Estimate costs. Add costs of local system to costs of regional system to produce estimated total cost to users 10 years after construction of regional project. Is the cost high enough to create pressure for more users?

4. *Health Services.* Estimate demand for hospital beds, nursing home beds, and other services as identified by the State Comprehensive Health Planning Agency.

5. *Solid waste disposal.* Estimate the amount of solid waste (tons per month) which will have to be collected and disposed of. Are there plans for dealing with this? Have sites been chosen? What will be approximate yearly costs for facilities and operations? Are there available approved disposal areas in the area?

6. *Schools.* How many additional school children can be anticipated? Using the estimated number of additional housing units in V.A. and accepted standards for the number of school children per unit.[1] Based on current cost per school child per year in each municipality, estimate future annual operating and construction costs. Relate the latter to debt section below.

7. *Municipal fiscal structure.* What are the anticipated effects of increased population on the fiscal position and tax rates of each municipality. Indicate whether or not there might be an increased financial burden on residents and if so, to what degree. (Again, it may be necessary to discuss this in terms of a range of possibilities.)[2] What are the capabilities of the towns with respect to their current and future debt capacity characteristics?

8. *Clean air.* What is existing air quality in the region based on current readings for particulates, photo chemical oxidants and sulphur oxides? With anticipated growth what would be the projected amount of deterioration in air quality in regard to these three parameters? Is this within the bounds of the EPA air quality increment standards?

9. *Water supply.* What are the current sources of potable water and what is the adequacy of such sources for meeting estimated future population needs? Determine what other sources might be available, how they might be brought into use and the approximate cost involved. Is depletion of streams or wastewater loading a concern in planning for future water supply?

10. *Flooding.* To what extent will the amount and speed of run-off be increased by estimated changes in land use, and what effect will this increased run-off have on frequency and magnitude of floods for 25-year storm, for 50-year storm?[3]

11. *Water quality.* What are the anticipated effects on stream quality and underground water quality of the run-off and increased wasteload resulting from the estimated development?

12. *Character of the region.* Would there be any significant changes in the appearance or functioning of the region which should be documented?

B. What are the most significant problems which can be foreseen as the result of the above described impacts of growth? Describe them at length.

1. *See Explanatory Notes at end of guidelines.*
2. *See Explanatory Notes at end of guidelines.*
3. *See Explanatory Notes at end of guidelines.*

C. Is the design and construction schedule of the proposed facility compatible with phasing of growth in the individual municipalities and in the region, or will large areas be opened up all at once?

VII. Weighing Alternatives

A. Which of the alternative proposals best minimizes adverse secondary impacts while providing an adequate solution to the water quality problems of the area?

B. It is possible that each of the proposed alternatives represents too large a solution in relation to existing problems, thus threatening the area with unnecessary secondary impacts. If this is the case, indicate ways in which you feel the project might be revised, scaled down or staged and still solve the water quality problems of the area.

VII. Qualifications of Consultants

A. It is apparent that preparation of an analysis of secondary impacts should be a team effort. Identify persons who prepared the statement and their qualifications in the fields of planning, traffic engineering, economics, hydrology, sanitary engineering, etc.

EXPLANATORY NOTES

1. **The following steps are suggested:**

   a. Estimate number of additional housing units. (See Section V., A.)

   b. New development will have considerably more multi-family units than has been true up to this time, so make assumptions within the following ranges.

      25% – 30% single family
      35% – 40% townhouses
      30% – 40% apartments

   c. The following coefficients for average number of school children in the different types of units are found in the County and Municipal Government Study Commission study.

      .3 – apartments
      .7 – townhouses
      1.5 – single family

   d. Multiplying these coefficients by the numbers of different types of units, one can arrive at a general estimate of the number of additional school children.

   See also *Evaluating the Fiscal Impact of the Planned Unit Development,* published by the Division of State and Regional Planning, 1974.

2. **In a general description of simplified fiscal impact analysis Real Estate Research Corporation of Chicago suggests the following methodology.**

   "The purpose of a fiscal impact study is to demonstrate the positive and negative impacts a given development or developments will have on a community, measured as the difference between revenues generated and the costs of services and facilities required.

   The basic approach is to determine the average per capita municipal costs to serve anticipated residents of a proposed development or developments or in the case of schools, operation and capital cost per student to accommodate anticipated new students. This is then compared to property tax anticipated from the proposed construction."

3. **Several methodologies have been developed for measuring anticipated increases in run-off in urbanizing areas. A very adequate one is described in:**

   Urban Hydrology for Small Watersheds. Central Technical Unit. Hydrology Technical Notes 1 and 20. U.S. Department of Agriculture, Soil Conservation Service, December, 1973. Upper Darby, Pennsylvania.

APPENDIX E

PRIME AND UNIQUE FARMLANDS PROGRAM

ILLINOIS

Illinois is adding some additional State categories to the Federal Prime and Unique classifications. Ten counties will be studied this year. Contact the SCS office for Illinois (see address below) for more information. Interested persons can have their names put on a mailing list to receive maps as they are published.

SCS Contact:

DANIEL E. HOLMES
U.S.D.A., Soil Conservation Service
FEDERAL BUILDING
200 W. CHURCH STREET
P.O. BOX 678
CHAMPAIGN, ILLINOIS 61820

958-9147 (FTS) 217-356-3785 (COMMERCIAL)

INDIANA

Indiana is using only the Federal Prime and Unique classifications. Surveys are underway in several counties. Contact the SCS State Office for assistance.

SCS Contact:

CLETUS J. GILLMAN
U.S.D.A., Soil Conservation Service
ATKINSON SQUARE - WEST
SUITE 2200
5610 CRAWFORDSVILLE ROAD
INDIANAPOLIS, INDIANA 46224

331-6515 (FTS) 317-269-6515 (COMMERCIAL)

MICHIGAN

Michigan is also studying non-agricultural lands. Work has begun on eight counties. A statewide map will be available based on past surveys. Contact the local (county) Soil Conservation Service office or the State office for more information.

SCS Contact

ARTHUR H. CRATTY
U.S.D.A., Soil Conservation Service
1405 HARRISON ROAD
EAST LANSING, MICHIGAN 48823

374-4242 (FTS) 517-372-1910 ext. 242 (COMMERCIAL)

MINNESOTA

Federal definitions for "prime", "good", "unique" and other lands are being used; the additional categories of "marginal" and "sub-marginal" are under consideration. Ten counties in the southeast part of the State are being worked on; five additional counties are proceeding on a trial basis. Contact the State Soil Conservation Service Office for assistance.

SCS Contact:

HARRY M. MAJOR
U.S.D.A., Soil Conservation Service
200 FEDERAL BUILDING AND U.S. COURTHOUSE
316 NORTH ROBERT STREET
ST. PAUL, MINNESOTA 55101

(612) 725-7675 (FTS and COMMERCIAL)

OHIO

Additional local categories are under consideration. Six counties are being studied this year. The focus is on those with rapidly expanding populations, including Clermont, Montgomery, Lucas, and Delaware. Contact the State Soil Conservation Service Office for information.

SCS Contact:

ROBERT E. QUILLIAM
U.S.D.A., Soil Conservation Service
311 OLD FEDERAL BUILDING
3rd and STATE STREETS
COLUMBUS, OHIO 43215

943-6785 (FTS) 614-469-8765 (COMMERCIAL)

WISCONSIN

Forage lands, important to Wisconsin's dairy industry, will be added to the Federal categories. Survey work is beginning. Contact the local Soil Conservation Service Office which is usually located at the county seat, for additional information.

SCS Contact:

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